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ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 6.] [1912.

## XXIX.—FUNGI EXOTICI, XIV.

G. Massee.

The following new species of Indian Fungi have been sent to Kew by Mr. Burkill from Calcutta. The specimens were very well preserved, and were accompanied by coloured drawings by Mrs. Burkill and notes so that it has been possible to draw up descriptions under particularly favourable conditions.

### Agaricaceae.

**Lepiota mimica**, *Massee*. *Pileus* carnosulus, campanulato-expansus, umbone valde prominente praeditus, longitudinaliter sericeo-fibrillosus, margine fimbriatus, siccus, albido-caesius, versus umbonem brunneus, 3–5 cm. latus. *Stipes* subcavus, sursum attenuatus, fibrillosus, glabrescens, pallido-fuscescens, 5–6 cm. longus; annulus albidus. *Lamellae* confertae, approximatae, latae, ex albido fuscescentes. *Sporae* ellipsoideae, albidae, 8 × 5 $\mu$.

India. Calcutta: Maidan. On decaying mown grass, *E. M. Burkill*, 31.

In many respects closely resembling *Lepiota mastoidea*, Fries. Distinguished by its smaller size and crowded gills, which are only just free from the stem.

**Lepiota punicea**, *Massee*. *Pileus* carnosulus, campanulato-expansus, puniceo-lutescens, flocculoso-squamosus, centro squamoso-hirtus, 1·5–2 cm. latus. *Stipes* aequalis, fibrilloso-floccosus, pileo concolor, 3–4 cm. longus, circa 2 mm. crassus; annulus mox evanidus. *Lamellae* confertae, postice rotundato-liberae, ex albo luteolae. *Sporae* subglobosae, oblique apiculatae, 5 × 4 $\mu$.

India. Calcutta: Secretary's Walk, *E. M. Burkill*, 23.

Allied to *Lepiota cinnabarina*, Alb. and Schw., differing in its smaller size, deciduous ring and subglobose spores.

**Lepiota flavophylla**, *Massee*. *Pileus* e convexo planus, sericeus, albidus, squamulis compressis brunneis variegatis, 2 cm. latus. *Stipes*

(24677—6a.) Wt. 189—808. 1125. 7/12. D & S.

sursum attenuatus, sericeus, albidus, 1·5–2 cm. longus; annulus membranaceus, persistens, albidus. *Lamellae* angustae, confertae, flavidae, acie fimbriata. *Sporae* ellipsoideae, hyalinae, 5 × 3 μ.

India. Calcutta: Secretary's Walk, *E. M. Burkill*, 15.

Allied to *Lepiota citriophylla*, Berk. and Broome, from which it is distinguished by its smaller size, paler yellow gills, and smaller spores.

**Lepiota sericea**, Massee. *Pileus* primo campanulatus, dein hemispherico-expansus, 4–6 cm. latus, umbone prominulo levissimo ornatus, margine inflexo fibrilloso, totus pallide ochraceus, squamulas minutas gerens. *Stipes* teres, aequalis, pileo concolor, levissimus, 4–5 cm., ad tertiam superiorem annulo concolore. *Lamellae* confertae, a stipite remotae, candidae. *Sporae* ellipticae, hyalinae, 9 × 4·5—5μ.

India. Calcutta: Indian Museum Compound; in plant pot and amongst grass, *E. M. Burkill*, 50, 32.

The colour of the cap is somewhat variable, sometimes with a tinge of brown, more especially at the disc. The stem becomes reddish-brown when dry, as also does the persistent ring. Allied to *L. excoriata*, Fries.

**Clitocybe pumila**, *Massee*. *Pileus* carnosulus, e convexo expansus, depressus vel subumbonatus, radiato-rugulosus, pallide umbrinus, depallens, 1–2 cm. latus. Stipes solidus, aequalis, pallidus, fibrillosus, saepe, incurvus, 1 cm. longus. *Lamellae* confertae, plus minusve decurrentes, sordidae. Sporae oblique ellipsoideae, hyalinae, 4 × 3μ.

India. Calcutta: Secretary's Walk; about ants nests under a wall, *E. M. Burkill*, 10. Allied to *Clitocybe parilis*, Fries.

**Tricholoma giganteum**, *Massee*. *Pileus* carnosus, e convexo expansus, glaber, margine incurvo, flocculoso, glauco-caesius, aetate canescens, 30–35 cm. latus. *Stipes* solidus, fibrilloso-striatus, sursum incrassatus, pileo concolor, 15–18 cm. longus, 6 cm. crassus. *Lamellae* confertae, postice sinuato-emarginatae, ventricosae, stramineae. *Sporae* oblique ellipsoideae, hyalinae, 7 × 5 μ.

India. Shamnagai; near Calcutta, *E. M. Burkill*, 44.

If the specimens and figures represent the normal condition of the fungus, it will rank amongst the largest of agarics, and is a very interesting addition to the mycological flora of India. Allied to *Tricholoma colossus*.

**Volvaria castanea**, *Massee*. *Pileus* carnosulus, cito explanato-expansus, margine subincurvus, centro non vel vix depressulus, glaberrimus, laete castaneus, 4–6 cm. latus. *Stipes* subcavus, aequalis, glaber, brunneo-tinctus, 4–6 cm. longus, volva ampla libera limbo lobata. *Lamellae* postice attenuato-liberae, ventricosae, confertae, sordidae incarnatae. *Sporae* subglobosae, leves, incarnato-tinctae, 7–8 μ.

India. Calcutta: Secretary's Walk; under the north side of a wall, *E. M. Burkill*, 36.

Readily distinguished amongst known species by the bright chestnut-coloured pileus. Allied to *Volvaria media*, Schum.

**Volvaria delicatula**, *Massee*. *Pileus* membranaceus, siccus, e conico-campanulato explanatus, interdum subumbonatus, fibroso-sericeus, primitus incarnato-tinctus dein decoloratus, 1–1·5 cm. latus. *Stipes* aequalis, filiformi, fibrillosus, pallidus, 1–1·5 cm. longus; volva

libera, limbo lobato vel fimbriata, pallida. *Lamellae* liberae, confertae, ex albo incarnatae. *Sporae* subglobosae, roseo-tinctae, laeves, 4 × 3 μ.

India. Calcutta: Secretary's Walk; under a wall. *E. M. Burkill*, 43.

A very beautiful little species, resembling *Volvaria temperata*, Berk., in size and general appearance, differing in the fibrously silky coloured cap, fimbriate limb of the volva and smaller subglobose spores.

**Annularia Burkillae**, *Massee*. *Pileus* carnosus, convexo-explanatus, subinde subdepressus, glaberrimus, levissimus, albidus, opacus, margine rectus, saepe fissus, rarius minutissime striatus, 8–12 cm. latus. *Stipes* solidus, rectus, teres, 7–10 × 1·5 cm. albus, primus pruinosus, dein glabratus, annulus parte tertia supera stipitis adnatus. angustus, albidus. *Lamellae* confertiusculae, latae, postice liberae, pallide incarnatae vel salmoneae. *Sporae* subglobosae, incarnato-tinctae, 7–8 × 5–6 μ.

India. Calcutta: Maidan; at the roots of trees, *E. M. Burkill*, 6.

The genus *Annularia*, founded by Schulzer von Müggenberg in 1866, is remarkable for the size and elegance of the species included. It is morphologically, the exact counterpart of *Lepiota*, in the *Leucosporeae*, and is characterised by having free, flesh-coloured or salmon-coloured gills, and a fixed ring or annulus. *A. Burkillae* is most nearly allied to *A. insignis*, Cke. & Mass., which differs in the scaly cap and ring, and smaller spores.

**Stropharia aurivella**, *Massee*. *Pileus* carnosus, e convexo expansus, floccosus, aureus, centro squamosus, miniatus, 3–4 cm. latus. *Stipes* fistulosus, cylindricus, fibrillosus, supra annulum politus, pileo concolor, 4 cm. longus. *Lamellae* confertae, adnatae, ventricosae, nigro-violaceae, acie fimbriata. *Sporae* ellipsoideae, purpureo-tinctae, 6 × 4 μ.

India. Calcutta: Maidan; among grass, *E. M. Burkill*, 33.

A very beautiful fungus, well marked by the floccose, golden-yellow cap ornamented with vermilion scales at the centre. Allied to *Stropharia aureo-fulva*, Berk., also an Indian species, which differs in the acutely umbonate pileus and erect ring.

**Agaricus squalidus**, *Massee*. *Pileus* carnosus, e convexo expanso-subumbonatus, siccus, fibrilloso-squamulosus, margine fibrilloso persistente, pallide brunneus, centro obscuriore, 5–6 cm. latus. *Stipes* solidus, aequalis, leniter flexuosus, 5–6 cm. longus, fibrillosus, pileo concolor; annulus membranaceo-tomentosus, persistens. *Lamellae* confertae, angustae, brunneae dein nigricantes. *Sporae* oblique ellipsoideae, obscurae, 7 × 4 μ.

India. Calcutta: Secretary's Walk, *E. M. Burkill*, 11.

Allied to *Agaricus silvaticus*, Fr., which differs in the hollow stem and larger spores.

# XXX.—MARINE ALGAE FROM NORTH OF NEW ZEALAND AND THE KERMADECS.

A. D. Cotton.

The marine algae of New Zealand are better known than those of any other country in the southern hemisphere. Many collections have been brought or sent to Europe, and during recent years Mr. R. M. Laing, together with other workers, has done much in discovering the rarer and less conspicuous species. His revised list of New Zealand algae (1899–1901) has proved most useful, and is generally regarded as a fairly complete list of the algal flora. Whilst this is true with regard to well-worked centres, it appears that in other parts, especially in the North Island, there is still ample scope for the marine botanist.

Amongst collections of marine algae received at Kew during the last few years were two forwarded by Miss Edith M. Smith from Little Barrier Island. These not only supplied species which were entirely unrepresented in British Herbaria, but contained representatives of important genera, which hitherto were not known to occur in New Zealand. Though only a few miles south of the Bay of Islands, the algae of which have been investigated by several botanists, the Little Barrier district is evidently well worth exploring. Miss Smith also collected at North Cape, and other spots in the North Island, but all the species forwarded from these localities were contained in the Little Barrier collection. A gathering from the Kermadecs however deserves special mention, as, previous to the paper recently published by Mr. and Mrs. Gepp, nothing was known of the algae of these islands. The group lies some 700 miles N.E. of Auckland, and is thus sufficiently distant from New Zealand for the flora to be of considerable interest. A general account of the botany and geology has been provided by Mr. R. B. Oliver (Trans. New Zeal. Instit. vol. xlii, 1909, p. 118–175), and the features of special interest to the algologist as described by Mr. Oliver were summarized by Mr. and Mrs. Gepp (Journ. Bot. xlix. 1911, p. 17). Miss Smith's gathering consisted only of a dozen plants, but it contained a well-marked species of *Haliseris* which proved to be undescribed.

Of the genera added to the New Zealand flora, two are members of the *Dictyotaceae*, namely *Gymnosorus nigrescens*, and *Taonia australiaca*, and two, *Galaxaura* sp. and *Liagora Harveyana*, are members of the tropical or warm-temperate *Florideae*. All four are probably Australian species, but in the present confused state of the literature it is impossible to determine the *Galaxaura*. Another Australian addition is *Nemastoma Feredaya*, and with it occurred the rare and apparently endemic *N. laciniata*. The discovery of *Haliseris* in the Kermadecs is interesting, as though well represented in Australia the genus is not known in New Zealand.

The two subjoined lists contain the names of the species forwarded from Little Barrier Island and the Kermadec group respectively. Common and generally distributed plants such as *Ulva Lactuca*, *Enteromorpha* spp. etc. are not included, neither are those which could only be named generically. With regard to Australian distribution, when no special area or colony is indicated the plant may be regarded as widely spread.

## Little Barrier Island.

**Cladophora herpestrica**, *Kütz.*, Spec. Alg., p. 415; Harv. in Hook. Fl. Nov. Zel. ii, p. 262.

A very distinct species occurring in sandy soil.

*Distr.* North Island, New Zealand.

**Caulerpa hypnoides**, *Ag.*, Spec. Alg., i, p. 443; Harv. in Hook. Fl. Nov. Zel. ii, p. 260.

*Distr.* Australia, New Zealand.

**Sargassum Sinclairii**, *Hook. et Harv.* in Lond. Journ. Bot. iv, p. 522; Harv. in Hook. Fl. Nov. Zel. ii, p. 211.

The common representative of the genus in New Zealand. Most of the other species recorded by Harvey (Fl. Nov. Zel.) are now excluded or referred to other genera, Laing indeed in his revised list retaining only *S. verruculosum*, Ag. (= *S. Raoulii* and *S. adenophyllum*, Fl. Nov. Zel.).

*Distr.* New Zealand, Chatham Islands, Kermadecs? (Spec. in Herb. Brit. Mus.)

**Carpophyllum Phyllanthus**, *Hook. et Harv.* in Lond. Journ. Bot. iv, p. 525; Harv. in Hook. Fl. Nov. Zel. ii, p. 212.

*Distr.* New Zealand, Chatham Islands, Kermadecs.

**C. maschalocarpum**, *Hook. et Harv.* in Lond. Journ. Bot. iv, p. 526; Harv. in Hook. Fl. Nov. Zel. ii, p. 212.

*Distr.* New Zealand, Kermadecs.

**C. plumosum**, *J. Ag.*, De Alg. Nov. Zel., p. 11. *Sargassum plumosum*, Rich., Harv. in Hook. Fl. Nov. Zel. ii, p. 212.

Laing (l.c.) points out that he has not seen specimens of this species from the South Island, and that it appears to be a distinctly northern form.

*Distr.* North Island N.Z., Chatham Islands, Kermadecs.

**Cystophora torulosa**, *J. Ag.*, Spec. Alg. 1, p. 242; Harv. in Hook. Fl. Nov. Zel. ii, p. 214.

*Distr.* Australia, New Zealand.

**C. retroflexa**, *J. Ag.*, Spec. Alg. i, p. 243; Harv. in Hook. Fl. Nov. Zel. ii, p. 214.

*Distr.* Australia, New Zealand.

**Xiphophora chondrophylla**, *Mont.*, Prodr., p. 12; Harv. in Hook, Fl. Nov. Zel. ii, p. 215. *Fucodium chondrophyllum*, J. Ag., Laing Rev. List, p. 66.

Mrs. Gepp remarks that "The main point of difference from *X. Billardierii* consists in the entire absence of the long strap-shaped laciniae, all the branches of the thallus ending in short dichotomous forks which form the receptacles" (Phycol. Memoires No. vi, p. 36). The Little Barrier specimens are typical *X. chondrophyllum*, but since Agardh has cast doubt on the occurrence of *X. Billardierii* in New Zealand, it may be added that Lyall's specimens from Cook's Straits in the Kew Herbarium are certainly referable to that species. Laing moreover believes that *X. Billardierii* is common in New Zealand, and that *X. chondrophyllum* is probably only a variety. (*See* Laing in Chilton, Subantarctic Islands of New Zealand, ii, p. 500.)

*Distr.* Southern Australia, New Zealand, Chatham and Auckland Islands.

**Splachnidium rugosum**, *Grev.*, Syn. Alg., p. xxxvi; Harv. in Hook. Fl. Nov. Zel. ii, p. 215.

A most interesting note on the biology of this plant is given by Laing in Trans. N.Z. Instit. vol. xxv, p. 288.

*Distr.* Australia, Cape of Good Hope, New Zealand (E. Indies? *teste* J. Agardh).

**Gymnosorus nigrescens**, *J. Ag.*, Anal. Alg. cont. i, p. 12.

New to New Zealand. The specimen is very common in many parts of Australia and has lately been recorded from the Kermadecs (Gepp l.c.). It is curious that such a conspicuous and distinct plant should not have been previously detected, but it is probably confined to the northern parts of the North Island.

*Distr.* N. and S. Australia, Kermadecs.

**Tonaria Turneriana**, *J. Ag.*, Om Chatham-öarnes Alger, p. 438. *Z. interrupta*, Ag., Harv. in Hook. Fl. Nov. Zel. ii, p. 218, non alior.

*Distr.* N. and S. Australia, New Zealand.

**Taonia australiaca**, *J. Ag.*, Anal. Alg. cont. i, p. 30.

This species which is an addition to the New Zealand flora is comparatively rare. J. Agardh described the plant from Port Phillip Heads, Victoria, and Mr. and Mrs. Gepp record it from the Kermadec islands. A specimen from the same islands exists in the Kew Herbarium, collected during the visit of H.M.S. "Herald" in 1854, and labelled *Zonaria lobata*.

*Distr.* Victoria, Kermadecs.

**Glossophora Harveyi**, *J. Ag.*, Till. Alg, Syst. ii, p. 3. *Dictyota Kunthii*, Ag., Harv. in Hook. Fl. Nov. Zel. ii, p. 219, non alior.

*Distr.* New Zealand, Chatham Islands.

**Perithalia capillaris**, *J. Ag.*, Till. Alg. Syst. vi, p. 5.

Apparently a northern species, being previously only known from Thames and Great Barrier Island. Miss Smith's collections contain specimens from North Cape, Kermadecs, and Little Barrier.

*Distr.* North Island N.Z., Kermadecs.

**Stypocaulon paniculatum**, *Kütz.*, Spec. Alg., p. 467. *Sphacelaria paniculata*, Suhr, Harv. in Hook. Fl. Nov. Zel. ii, p. 221.

Very common in New Zealand.

*Distr.* Australia, New Zealand.

**Stypocaulon funiculare**, *Kütz.*, Spec. Alg., p. 467. *Sphacelaria funicularis*, Mont., Harv. in Hook. Fl. Nov. Zel. ii, p. 221.

*Distr.* New Zealand, Cape Horn, S. Chile, Tristan d'Acunha, S. Australia?

**Liagora Harveyana**, *Zeh*, MS.

The plants sent from Little Barrier are the same as those collected by Harvey in Victoria, and sent out by him as *L. viscida*, in his "Australian Algae" (354 B.) Dr. R. Pilger and Herr Zeh of Berlin have lately been working on the genus, and have examined the material in the Herbarium of the British Museum. Herr Zeh decided that the present species is distinct from *L. viscida* of

Europe, and labelled Harvey's specimen *L. Harveyana*, Zeh, ms Dr. Pilger informs me that the publication has been delayed but that the description of the new species will appear shortly.

This tropical and warm-temperate genus is new to New Zealand, but it appears to be plentiful in certain parts of the North Island. Mr. R. H. Shakespear, who forwarded the first batch of Miss Smith's material, remarks in a letter that he has since found *Liagora* in abundance at Tiri Tiri Island, 25 miles due south of Little Barrier. The plant resembles *L. viscida* in habit, but differs in certain structural details, which will doubtless be fully dealt with by Herr Zeh.

*Distr.* Victoria, Tasmania, North Island N.Z.

**Scinaia furcellata**, *Bivona* in L'Iride, 1822 ; Harv. in Hook. Fl. Nov. Zel. ii, p. 245.

Known in New Zealand from the North Island only.

*Distr.* Temperate and tropical seas.

**Galaxaura**, *sp.*

The species forwarded is the same as that which occurs in the Kermadecs (v. Gepp. l.c. p. 21). It was of interest to receive the plant from Miss Smith both from North Cape and from Little Barrier, as showing that though an addition to the New Zealand flora it is well established in the North Island. It is probably an undescribed species, but, for the reasons stated by Mr. and Mrs. Gepp, it appears most satisfactory to leave it for the present un-named.

**Gelidium caulacantheum**, *J. Ag.*, Epic., p. 548. (*G. corneum*, var. *subulifolium*, Harv. in Hook. Fl. Nov. Zel. ii, p. 243 ?)

*Distr.* New Zealand.

**Pterocladia lucida**, *J. Ag.*, Spec. Alg. ii, p. 483 ; Harv. in Hook. Fl. Nov. Zel. ii, p. 244.

*Distr.* Australia, New Zealand.

**Gigartina divaricata**, *Hook. et Harv.* in Flor. Antart., p. 75. *G. pistillata*, Lamour., Harv. in Hook. Fl. Nov. Zel. ii, p. 251, *partim.*

*Distr.* Australia, New Zealand.

**G. alveata**, *J. Ag.*, Spec. Alg. ii, p. 271 ; Harv. in Hook. Fl. Nov. Zel. ii, p. 252.

This curious and very distinct species appears to be somewhat rare and confined to the North Island. Banks' specimens are in the Kew Herbarium, and also Cunningham's and Hooker's. The two latter, together with Berggren's, were collected in the Bay of Islands.

*Distr.* North Island N.Z.

**Gymnogongrus nodiferus**, *J. Ag.*, Epic., p. 210. *G. furcellatus*, J. Ag., Harv. in Hook. Fl. Nov. Zel. ii, p. 250, *partim.*

*Distr.* New Zealand.

**Melanthalia abscissa**, *Hook. et Harv.* in Lond. Journ. Bot. iv, p. 548 ; Harv. in Hook. Fl. Nov. Zel. ii, p. 242.

*Distr.* New Zealand.

**Plocamium costatum**, *Hook. et Harv.* in Lond. Journ. Bot. vi, p. 404 ; Harv. in Hook. Fl. Nov. Zel. ii, p. 246.

*Distr.* Australia, New Zealand.

P. brachiocarpum, *Kütz.*, Spec. Alg., p. 885. *P. coccineum*, Lyngb., Harv. in Hook. Fl. Nov. Zel. ii, p. 245, *non* Lyngb.

Distinguished from *P. abnorme*, which it closely resembles, by the long-stalked, flabellately branched sporophylls, which spring from the sides of the branches.

*Distr.* New Zealand, Chatham Islands, Kermadecs.

Delisea pulchra, *Mont.* in Ann. Sci. Nat. Bot. 3 sér., t. i, p. 158.

Apparently rare in New Zealand, and probably confined to the warmer parts. Laing (l.c.) states that Berggren's specimen from the Bay of Islands is the only known record. Miss Smith sent three specimens—two from Little Barrier, and one from the Kermadecs. The plant is very apt to be confused with *Phacelocarpus Labillardeiri*, and it is quite possible that New Zealand collectors have mistaken it for that alga.

*Distr.* Australia, New Zealand, Kermadecs.

Asparagopsis armata, *Harv.* in Trans. Irish Acad. xxii, p. 544. *A. Delilei*, Harv. in Hook. Fl. Nov. Zel. ii, p. 233 (*non* Mont.).

*Distr.* Australia, New Zealand, Chatham Islands.

Laurencia distichophylla, *J. Ag.*, Spec. Alg. ii, p. 762 ; Harv. in Hook. Fl. Nov. Zel. ii, p. 234.

It is probable that New Zealand, and not South Africa, was the original locality for this species (*v.* J. Ag., l.c., p. 763). The plant is frequent in the North Island, several gatherings from various parts existing in the Kew Herbarium. Miss Smith's material was copious, and in fine condition.

*Distr.* New Zealand.

L. virgata, *J. Ag.*, Spec. Alg., ii, p. 752 ; Harv. in Hook. Fl. Nov. Zel. ii, p. 234.

To *L. virgata* both J. Agardh and Harvey refer a well-known New Zealand *Laurencia*, and Laing and others have followed them. It is doubtful if the plant is identical with the original *L. virgata* from the Cape, and in my Chatham Islands paper it was referred to *L. botryoides*, Gaill. (Kew Bull., 1907, p. 47). The latter is common in Australia, but as it appears to differ to a certain extent, it is perhaps advisable for the present to keep the New Zealand plant under *L. virgata*.

*Distr.* Cape, Australia, New Zealand.

Laurencia spp. Several other species of *Laurencia* were forwarded by Miss Smith, but none could be determined with certainty. One resembles very closely in habit *L. obtusa* of Europe, and another, a broad form of *L. pinnatifida*, but in the absence of a complete series it is impossible at present to feel confident as to their identity. The genus needs long and careful study in its natural habitat, and it is only by this method that the various forms can be correctly linked together. If collectors could send a set of specimens showing the variability displayed by each species, and the various forms of reproductive organs, it would greatly help to clear up the confusion existing in European herbaria. Falkenberg has recently shown that the nature of the antheridial conceptacle varies greatly in different species, and it is clear that systematists must in future give more attention to the nature of this structure.

**Cladhymenia oblongifolia**, *Hook. et Harv.*, in Lond. Journ. Bot. iv, p. 540; Harv. in Hook. Fl. Nov. Zel. ii, p. 235.

*Distr.* New Zealand, Chatham Islands.

**Aphanocladia delicatula**, *Falkenb.* in Engler and Prantl, Pflanzenfamilien, T. i, Abt. 2, p. 444. *Rytiphlaea delicatula*, Harv. in Hook. Fl. Nov. Zel. ii, p. 224.

*See* note in Kew Bulletin, 1909, p. 242.

*Distr.* New Zealand, New South Wales (*teste* Reinbold).

**Euzoniella ovalifolia**, *Falkenb.*, Rhodomelaceen, p. 369. *Polyzonia ovalifolia*, Harv. in Hook. Fl. Nov. Zel. ii, p. 226, tab. 112B.

A few fragments were found attached to *Cheilosporium corymbosum*. A rare plant, one gathering only being cited in Laing's List.

*Distr.* New Zealand, Chatham Islands.

**E. incisa**, *Falkenb.*, l.c., p. 369. *Polyzonia Harveyana*, Dcne., Harv. in Hook. Fl. Nov. Zel. ii, p. 227.

Falkenberg (l.c.) distinguished *E. Harveyana* (= *P. incisa*, var. *Harveyana*, J. Ag.) from the present plant, on the ground that the lowermost pinnules of each short shoot were branched. This characteristic is lacking in the Kew specimens, and it appears to me questionable whether Falkenberg's material was not exceptional, and that the two are not forms of one species, as was formerly supposed.

*Distr.* Australia and New Zealand.

**E. adiantiformis**, *Falkenb.*, l.c., p. 369. *Polyzonia adiantiformis*, Dcne., Harv. in Hook. Fl. Nov. Zel. ii, p. 226.

A few fronds of this rare species were found upon *Gigartina divaricata*.

*Distr.* New Zealand.

**Dipterosiphonia dendritica**, *Falkenb.*, l.c., p. 324. *Polysiphonia dendritica*, Ag., Harv. in Hook. Fl. Nov. Zel. ii, p. 223.

*Distr.* Australia and New Zealand.

**Vidalia Colensoi**, *J. Ag.*, Spec. Alg. ii, p. 1127. *Epineuron Colensoi*, Harv. in Hook. Fl. Nov. Zel. ii, p. 232.

Apparently common in the North Island, several localities being given by Laing. In a dried state, unless carefully examined, it is liable to be confused with *Phacelocarpus*.

*Distr.* North Island N.Z.

**Euptilota formosissima**, *Kütz.*, Spec. Alg., p. 671. *Ptilota formosissima*, Mont., Harv. in Hook. Fl. Nov. Zel. ii, p. 257.

*Distr.* Australia, New Zealand.

**Ballia callitricha**, *Mont.*, Voy. Pôle Sud., p. 94; Harv. in Hook. Fl. Nov. Zel. ii, p. 257.

Apparently neither this nor the following species have been previously recorded north of Lyall Bay in Cook's Strait.

*Distr.* Southern Australia, New Zealand, Chatham Islands.

**B. scoparia**, *Harv.*, Phyc. Austral., tab. 168. *Callithamnion scoparia*, Harv. in Hook. Fl. Nov. Zel. ii, p. 259.

*See* note above.

*Distr.* Southern Australia, Cape Horn, Falkland Islands, New Zealand.

**Ceramium clavulatum**, *Ag.* in Kunth. Syn. pl. æquin. 1, p. 2. *Centroceras clavulatum*, *Mont.*, Harv. in Hook. Fl. Nov. Zel. ii, p. 257.

*Distr.* Tropical and warm-temperate seas.

**Microcladia Novae-Zelandiae**, *J. Ag.*, Anal. Algol. cont. iv, p. 35.

Common south of Lyttleton (*teste* Laing). New Zealand specimens of this genus are not to be found in British herbaria.

*Distr.* New Zealand.

**Nemastoma Feredeyae**, *Harv.*, Fl. Tasm., p. 327, t. 195A.

New to New Zealand. The structure of *Nemastoma* is so distinct that there is no difficulty in ascertaining the generic position of the specimens. As far as can be seen, they differ in no way from *N. Feredeyae*, which is not uncommon in Victoria and Tasmania.

*Distr.* *Vide supra.*

**N. laciniata**, *J. Ag.*, Epic., p. 128.

The specimen agrees well with Agardh's description of *N. laciniata*, but the plant is not represented in British herbaria, and it appears to be of rare occurrence.

*Distr.* New Zealand.

**Cheilosporium corymbosum**, *De Toni*, Syll. Alg. iv, p. 1826. *Amphiroa corymbosa*, *Dene.*, Harv. in Hook. Fl. Nov. Zel. ii, p. 237.

*Distr.* Australia, New Zealand.

**C. elegans**, *Aresch.* in J. Ag. Spec. Alg. ii, p. 546. *Amphiroa elegans*, Harv. in Hook. Fl. Nov. Zel. ii, p. 237.

*Distr.* New Zealand, Kermadecs.

**Corallina Cuvieri**, *Lamour.*, Pol. fléx., p. 286. *Jania Cuvieri*, Harv. in Hook. Fl. Nov. Zel. ii, p. 237.

*Distr.* Australia, New Zealand.

**Jania micrarthrodia**, *Lamour.*, Pol. fléx., p. 271; Harv. in Hook. Fl. Nov. Zel. ii, p. 237.

*Distr.* Australia and New Zealand.

## Kermadec Islands.

The following twelve species were collected by Miss Smith during her stay in the islands; most were also found by Mr. Oliver, but several are additions (*see* Gepp, l.c.). Six species collected in the islands during the visit of H.M.S. "Herald" in 1854 and by the "Challenger" Expedition in 1874, have been observed in the Kew Herbarium, and two of these, not having been found by Miss Smith, are recorded in the list.

**Cladophora fusca**, *Martens*, Preuss. Exped., p. 22, tab. 3, fig. 1.

The specimens agree exactly with those received by Mr. and Mrs. Gepp. The plant was also found during the "Herald" visit, and thus, though rare and little known, is apparently common in the Kermadec group.

*Distr.* Tropical Pacific.

**Carpophyllum maschalocarpum**, *Hook. et Harv.* *Vide supra.*

**C. Phyllanthus**, *Hook. et Harv.* *Vide supra.*

**C. elongatum**, *A. et E. S. Gepp*, in Journ. Bot., xlix, 1911, p. 20. *See* note on the synonomy of this species in the paper cited. A "Challenger" specimen collected 30 miles off Raoul Island exists in the Kew Herbarium. The plant was not found by Miss Smith.

**Zonaria nigrescens**, *J. Ag.*

The plant was also collected by Oliver. *See* note above.

**Taonia australiaca**, *J. Ag.*

Another rare and little known species. It was found in Little Barrier Island by Miss Smith, and in the Kermadec group both by Oliver and by the "Herald" botanists. *See* note above.

**Haliseris Kermadecensis**, *Cotton*, sp. nov.

Ab *H. Polypodioide* frondibus venosis, ab *H. Plagiogramma* sinubus frondium acutis recedit.

Frons 15–18 cm. alta, basi eximie stuposa et plerumque stipite longo ramoso suffulta, sensim in segmenta dichotoma sinubus acutis abiens. Segmenta 5–8 mm. lata, linearia, venosa, apice attenuata margine integerrima. Venae distinctae, circ. 1 mm. distantes, a costa ad marginem oblique excurientes. Tetrasporangia in soros elongatos collecta. Oogonia ignota.

Kermadec Islands. E. M. Smith, 1908.

The present species resembles in outward form specimens of *H. polypodioides* in which the segments are narrow and the axils decidedly acute. In structure, however, it is quite distinct, being closely allied to the West Indian *H. Plagiogramma*, and it is not without some hesitation that the plant is described as new. Its larger and apparently more robust fronds, together with its acute axils, furnish distinguishing macroscopic features: and coupled with these, the veins are found to be decidedly thicker, and more regularly developed than in *H. Plagiogramma*. In all the Kew specimens of the West Indian plant, there is moreover a tendency for the veins to be incompletely joined to the main nerve, a peculiarity which is not found in the Kermadec specimens. These differences appear to be of sufficient importance to warrant its being regarded as a distinct species, specially since there is no certain record of *H. Plagiogramma* occurring outside the West Indian region, and the north of S. America.

The only other species to which the plant could be referred is *H. australis*, Sond., but though the structure is similar, that species (judging from the description) is very much larger, resembling in habit *H. serrata*. A few doubtful records occur, which suggest the possibility that the present plant has been collected in Australia, but it certainly does not agree with any species that have been described from that continent.

**Perithalia capillaris**, *J. Ag.*

**Galaxaura** *sp. Vide supra.*

This plant is precisely the same as that referred to by Mr. and Mrs. Gepp (*see* note above). It was also found by the "Herald" in 1854.

**Pterocladia capillacea**, *Born. et Thur.*, Notes Algol., p. 57, tab. 20.

The specimens appear to agree with the European *P. capillacea*, but cystocarps are lacking, hence there is a certain amount of

doubt. The plant was also found by the "Herald" and by Oliver (*see* Gepp. l.c.).

*Distr.* Apparently general.

**Cordylecladia** *s.p.*

An interesting specimen, apparently belonging to this genus, was forwarded. The structure is cellular, and the swollen apices of the branches contain cruciate tetraspores. The fronds are 2–3 inches high, rather slender, and but slightly branched. With the exception of Grunow's record of *C. irregularis* Harv., from Fiji (which is doubtful) the genus has not been recorded from the New Zealand region. The material forwarded is hardly sufficient for descriptive purposes.

**Plocamium brachiocarpum**, *Kütz.* *Vide supra.*

**Delisea pulchra**, *Mont.* *Vide supra.*

**Corallina Cuvieri**, *Lamour.* *Vide supra.*

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## XXXI.—CONTRIBUTIONS TO THE FLORA OF SIAM.

### Additamenta, II.

**Hebonga siamensis**, *Radlk.* [Simarubaceae]; affinis *H. molli*, Radlk., a qua differt foliolis minoribus inaequilateris subfalcatis acuminatis.

*Arbor* magna, ramis 1·5 cm. crassis apice conico pilis rufis septatis tomentello conferte folia pinnata paniculasque axillares gerentibus. *Folia* 7–9-juga, foliolo terminali parvo deciduo (vel interdum abortivo ?), ad 36 cm. longa, petiolo circiter 8 cm. longo adjecto; foliola opposita vel subalterna, ovato-lanceolata, subfalcata, inaequilatera (latere inferiore latiore vix longiore), apice in acumen lineare obtusum protracta, intermedia majora cum petiolulis 5 mm. longis ad 10 cm. longa, 3·5 cm. lata, superiora inferioraque decrescentim minora, subcoriaceo-chartacea, nervis venisque supra impressis insignia, supra praeter nervos puberulos glabra, nitidula, subtus pilis subflavidis molliuscule puberula et papillis nodiformibus ornata, inde opaca, cano-viridula. *Paniculae* pauciramosae, 14–16 cm. longae, ramis 8 cm. longis. *Reliqua* generis (cf. Radlk., Philipp. Journ. Sc., vi. 1911, p. 365) attamen ductibus resinigeris petiolulos quidem, vix vero foliolorum nervos medianos ingredientibus.

Sriracha, Nawng Kaw, 30 m., *Kerr*, 2076 (♂)—"a large tree in evergreen jungle."

**Allophylus eustachys**, *Radlk.* [Sapindaceae-Thouinieae]; in conspectu *Allophylorum* auctore Radlk. (in Sitzungsber. K. bayer. Ac., xxxviii. 1908, p. 209) post *A. javensem*, Blume (p. 231) inserenda, a quo differt omnium partium hirsutie.

*Arbor* 7·5 m. alta (ex *Kerr*); rami teretes, 4 mm. crassi, ut et petioli, petioluli thyrsique pilis patulis subfusce hirsuti, cortice pallido lenticelloso-punctato. *Folia* 3-foliolata, 17–28 cm. longa, petiolo robusto teretiusculo supra sulco apice tantum manifesto exarato 17–28 cm. longo adjecto; foliola rhombeo-lanceolata, acuminata, intermedia basi cuneata, lateralia basi valde inaequilatera in petiolulos contracta, intermedia cum petiolulo 1·5 cm. longo 12–18 cm.

longa, 4–6 cm. lata, lateralia paullo minora, petiolulis 5-6 mm. longis, subrepande mucronulato-denticulata, membranacea, nervis utrinque 10–13 sat approximatis procurvis subtus prominulis in mucronulos pilosos excurrentibus, saturate viridia, opaca, supra pilis brevioribus praesertim ad nervos obviis hirtella, subtus pilis longioribus undique crebris subhirsuta margineque ciliata, epidermide valde mucigera. *Thyrsi* axillares, solitarii, simplices, robustiores, stricti, ad 20 cm. longi, rhachi striata hirsuta fere a basi cincinnos glomeruliformes sessiles crebros gerente ; alabastra 1·5 mm. diametro ; flores mediocres, breviter pedicellati. *Sepala* glabriuscula. *Petala* cochleariformia, ungui longo pilosiusculo, squama biloba villosa. *Discus*, *stamina*, *germen* puberula. *Fructus* juvenilis cocci globosi, pilis longiusculis laxe adspersi ; fructus maturus non visus.

Chiengmai, Ban Pong, in mixed jungle by a stream, 330 m., *Kerr*, 1944.

**Sapindus? siamensis**, *Radlk.* [Sapindaceae-Sapindeae]; ob fructum ignotum dubia, si revera hujus generis affinis *S. tomentoso*, Kurz (sectionis *Dittelasma*), a quo inter alia differt germine tomento denso flavescente-albido induto.

*Arbor* ramis teretiusculis sulcatis 3–4 mm. crassis griseo-pubescentibus cortice nigro-fusco. *Folia* abrupte pinnata, 3–4-juga, petiolo 4–6 cm. longo adjecto 20–30 cm. longa, rhachi supra bisulcata sordide pubescente in apiculum sterilem subulatum terminata ; foliola 5–7, inferiora subopposita, superiora alterna, elliptico-oblonga, utrinque obtusa vel subacuta, interdum quodammodo inaequilatera, inferiora latere exteriore, superiora latere interiore angustiora brevioraque, cum petiolulis 3–5 mm. longis 10–18 cm. longa, 4–7 cm. lata, integerrima, membranaceo-chartacea, nervis lateralibus utrinque 10–12 sat approximatis oblique erectis venisque reticulatis supra vix subtus sat prominentibus, supra praeter nervos glabriuscula, e livescenti-viridi in subfuscum vergentia, nitidula, subtus molliter pubescentia, pallidiora, opaca, glandulis microscopicis clavatis superficiei subadpressis (nec ut in reliquis *Sapindi* speciebus in foveolas conchiformes impressis) raris adspersa, epidermide paginae superioris e cellulis valde convexis granulato-punctatis inanibus conflata, paginae inferioris stomatum copia insigni. *Panicula* terminalis, 13–18 cm. longa, pauciramosa, rhacheos apice ramisque thyrsoideis dense cymulas (polychasia vel dichasia in cincinnos abeuntia) subsessiles gerentibus, bracteis bracteolisque subulatis pubescentibus. *Flores* unisexuales, 5 mm. longi et lati, oblique symmetrici, ♂ breviter, ♀ longius pedicellati, pedicellis 3–6 mm. longis basi articulatis. *Sepala* 5, breviter oblonga, obtusa, dense albide tomentosa, ciliata, intus subglabra. *Petala* 4 (infimi sede inter sepalum 3 et 5 vacua) sub disci margine inserta, subspatulata, lamina ovato-oblonga obtusiuscula concava dorso puberula intus glabra in unguem lamina paullo breviorem dorso margineque villosum attenuata, supra unguem squamulis 2 deflexis dense villoso-barbatis dorso minutim cristatis aucta. *Discus* (in floris parte superiore ante sepalum 4) unilateralis, inter petalorum insertiones in lobulos tumens, glaber. *Stamina* 8, intra discum circa pistillum vel pistilli rudimentum inserta, filiformia, floris ♂ exserta, floris ♀ breviora, germen vix superantia, sterilia, praeter apicem villosula, antheris breviter ovatis subapiculatis dorso supra basin emarginatam

affixis introrsis glabris. *Germen* (floris ♂ rudimentarium) ad disci marginem inferiorem ante sepalum 3 et 5 insertum, trigono-ovatum, 3-sulcatum, 3-loculare, dense albide tomentosum, in stylum germen aequantem subulato-filiformem sursum curvatum pubescentem apice incrassato-stigmatosum terminatum ; gemmulae in loculis solitariae, prope basin axeos tuberculo insidentes, erectae, apotropae, campylotropae, micropyle extrorsum infera. *Fructus* non visus.

Phre, 156–260 m., *Luang Vanpruk*, 119, 191.

Lao name, Ma fueng pa (ex *Luang Vanpruk*).

**Mischocarpus grandis**, *Radlk.*, comb. nov. *Pedicellia grandis*, Pierre, Fl. For. Cochin., t. 324 A.

Chiengmai, Doi Sootep, 900 m., *Kerr*, 1823.

**Murtonia**, *Craib*, gen. nov., inter *Hedysareas* et *Phaseoleas* ponendum ; ad illas fructu, ad has habitu accedit.

*Calycis* lobi duo posteriores in unum emarginulatum connati, lateralibus infimoque subaequales. *Vexillum* amplum, subrotundatum, basi cuneatum ; alae oblongae, basi sagittatae, unguiculatae ; carina obtusa, unguiculata. *Stamen* vexillare liberum, ceteris connatis. *Ovarium* lineare, multi-ovulatum, stylo glabro, stigmate parvo terminali capitato. *Legumen* exsertum, articulatum, seminibus plerumque 7–9, stipitatum vel ob semina infima abortiva longe stipitatum.—*Suffrutex* scandens, partibus fere omnibus (floribus exceptis) pilis albidis brevibus uncinatis rigidiusculis instructus. *Folia* imparipinnata, stipulis conspicuis rigidis ; foliola opposita, penninervia, stipellata. *Inflorescentia* axillaris, ample simpliciter paniculata.

Species *unica*.

**Murtonia Kerrii**, *Craib*, sp. n.

*Suffrutex* scandens ; ramuli primo pilis uncinatis albidis brevibus rigidiusculis instructi, mox glabri vel fere glabri, virides, interdum brunneo-maculati, teretes. *Folia* imparipinnata, petiolo 3–7 cm. longo pilis iis ramulorum similibus instructo suffulta ; stipulae ovatae, apice acuminatae, pungentes, basi auriculatae, circiter 1·7 cm. longae et 9 mm. latae, saepissime reflexae, virides, striatae, dorso breviter hirsutulae ; foliola 5, terminali a lateralibus 1·5–2·5 cm. distante, lateralibus oppositis paribus inter se 3–4·5 cm. distantibus, lanceolata vel late lanceolata, apice acuminata, acuta, basi rotundata, subcordata, 5·5–16 cm. longa, 1·3–4·4 cm. lata, rigide chartacea vel fere subcoriacea, nervis lateralibus utrinque 16–18 obliquis intra marginem anastomosantibus supra conspicuis vel fere prominulis subtus prominentibus, nervis transversis subtus prominentibus, supra matura glabra nisi costa basin versus pilis paucis uncinatis instructa, subtus pallidiora, costa nervisque pilis parvis uncinatis instructa, margine cartilagineo crispato ; rhachis pilis iis ramulorum similibus instructa ; petioluli breves, validiusculi, albohirsuti, supra canaliculati ; stipellae rigidae, lineari-lanceolatae, pungentes, ad 1 cm. longae, 1·5 mm. latae, subglabrae, nervatae. *Inflorescentia* axillaris, simpliciter paniculata, pedunculo 6–15 cm. longo inferne indistincte angulato angulis praecipue pilis uncinatis albidis instructo suffulta ; flores solitarii vel gemini ; bracteae lanceolatae vel ovato-lanceolatae, acutae, 2·5 mm. longae, 0·75 mm. latae, rigidiusculae, costatae, ciliatae ; pedicelli teretes, 1·5 mm. longi. *Calyx* 3·5 mm. longus ; lobi inter se longitudine subaequales, posteriores in unum late deltoideum emarginulatum connati, laterales

infimusque anguste deltoidei, acuti. *Vexillum* subrotundatum, 8 mm. diametro, basi cuneatum ; alae oblongae, basi obtuse sagittatae, 7·5 mm. longae, ungui gracili 1·5 mm. longo suffultae, medio carinae adhaerentes ; carina obtusa, 7 mm. longa, ungui 2 mm. longo suffulta. *Stamen* vexillare liberum. *Ovarium* multi-ovulatum, lineare, 7 mm. longum ; stylus circiter 2 mm. longus, stigmate capitato terminali. *Legumen* compressum, ad 4·5 cm. longum, 4·5 mm. latum, ad 9-articulatum, stipitatum vel saepe ob semina inferiora abortiva longe pseudo-stipitatum, pilis iis ramulorum similibus tectum.

Cultivated at Chiengmai from seed collected at Lakon Lumpang, in mixed jungle, 360 m., *Kerr*, 1534,—"standard white, keel and wings purple."

**Afzelia xylocarpa**, *Craib*, comb. nov. *A. siamica*, Craib, Kew Bull. 1911, p. 47. *Pahudia xylocarpa*, Kurz, For. Fl. Burma, i. p. 413.

Chiengmai, by streams on Doi Sootep, 330 m., *Kerr*, 1068 ; Siam, *Teysmann* ; ? Korat, *Witt*, 1.

*Distr.* Upper Burma : Shan Hills, *Abdul Huk*, 134.

Siamese name, Mai Makha Yai (ex *Witt*).

**Styrax benzoides**, *Craib* [Styracaceae]; a *S. benzoin*, Dryand., fructibus multo minoribus, pericarpio multo tenuiore in valvas tres regulariter dehiscente, a *S. suberifolio*, Hook. et Arn., floribus fructibusque minoribus, ab ambobus indumento tenuiore recedit.

*Arbor* parva vel mediocris (ex *Kerr*) ; ramuli graciles, primo stellato-tomentelli, mox glabri, cortice rubro-brunneo vel pallide brunneo irregulariter longitudinaliter fisso obtecti. *Folia* ovato-lanceolata apice acuminata, acuta, basi cuneata vel late cuneata, rarissime cuneato-rotundata, 7–15 cm. longa, 3·6–5·7 cm. lata, rigide chartacea, supra glabra, subtus nisi nervis parce stellato pubescentibus dense breviter tomentella, nervis lateralibus utrinque circiter 9 obliquis intra marginem anastomosantibus supra conspicuis subtus prominentibus, petiolis 1–1·2 cm. longis indumento ut foliorum pagina inferiore suffulta. *Inflorescentia* e paniculis duobus racemiformibus axillaribus superpositis superiore ad 5 cm. longa inferiore dimidio breviore constituta ; rhachis breviter stellato-tomentella ; bracteae fugaces ; bracteolae deciduae, vix 2 mm. longae ; pedicelli circiter 4 mm. longi, indumento ut calyce corollaque extra et foliorum pagina inferiore. *Calyx* truncatus, 3·5 mm. altus, intra superne tenuiter sericeus. *Corollae* albae (ex *Kerr*), tubus 2 mm. longus, lobi late lineares, 9 mm. longi, 1·75 mm. lati, intra superne subsericei, inferne parcissime adpresse albo-pubescentes. *Filamenta* 2·5 mm. longa, breviter albo-pilosa ; antherae 3·5 mm. longae. *Ovarium* circiter 2 mm. altum, adpresse albo-pubescens ; stylus 1·2 cm. longus, glaber. *Fructus* ad 1 cm. altus, pericarpio extra cinereo-tomentello corrugato 0·5 mm. crasso in valvas tres regulariter dehiscente.—*S. Benzoin*, Craib, Kew Bull. 1911, p. 409, *non* Dryand.

Chiengmai, in evergreen jungle on Doi Sootep, 1050–1350 m., *Kerr*, 669 ; in evergreen jungle, 600–1200 m., *Kerr*, 669*b*.

Lao name, Kŭm Yan (ex *Kerr*).

**Strobilanthes Kerrii**, *Craib* [Acanthaceae-Ruelieae]; a *S. multidente*, C. B. Clarke, foliis brevius obtuse acuminatis crenato-serratis vel obsolete crenato-serratis recedit.

*Suffrutex* circiter 9 dm. altus; caules crispatim pubescentes, demum puberuli. *Folia* ovato-lanceolata vel elliptica, inaequilatera, apice acuminata, obtusa, basi latere altero rotundato altero cuneato, conspicue inaequalia, majora 5·5–16 cm. longa, 2·5–8·3 cm. lata, minora saepe decidua, ad 4·5 cm. longa, chartacea, supra lineolata, costa nervisque adpresse crispatim pubescentia, subtus pallidiora, molliter pubescentia, crenato-serrata vel obsolete crenato-serrata, nervis lateralibus utrinque ad 7 supra conspicuis subtus prominulis, nervis transversis satis distantibus pagina utraque conspicuis; petioli foliorum majorum ad fere 2 cm. longi, minorum circiter 5–7 mm. longi, crispatim pubescentes. *Spicae* capituliformes, axillares, longius pedunculatae; bracteae ovatae vel oblongae, 0·5–1·1 cm. longae, 3·5–4·5 mm. latae, extra et apicem versus intra hirsutae; bracteolae lineari-oblanceolatae, acutiusculae, 7 mm. longae, 1·5 mm. latae. *Sepala* 5, subaequalia, lineari-oblanceolata, obtusiuscula, circiter 1 cm. longa et 1·75 mm. lata, superne dense subferrugineo-glanduloso-pilosa. *Corolla* purpurea (ex *Kerr*), 4·7 cm. longa, parte basali aequali circiter 1·7 cm. longa et 1·5 mm. diametro, parte expansa 1·2 cm. diametro, lobis oblongis. *Stamina* 4. *Ovarium* 2 mm. altum, apice glandulosum; stylus inferne parce glanduloso-pubescens.

Phre, Hue Kamin, by streams, 300 m., *Kerr*, 988.

**Strobilanthes (Buteraea) rubro-glandulosus**, *Craib* [Acanthaceae-Ruellieae]; a *S. acuminato*, Wall., foliis ovatis vel ovato-lanceolatis crasse irregulariter crenatis recedit.

*Suffrutex* sarmentosus; caules parce rubro-glandulosi, minute crispato-puberuli, mox subglabri. *Folia* opposita subaequalia vel distincte inaequalia, ovata vel ovato-lanceolata, apice acuminata, obtusa, basi cuneata, 4·5–10 cm. longa, 2·5–5 cm. lata, crasse irregulariter crenata, tenuiter chartacea, supra glabra, lineolata, subtus pallida, glandulis rubris sessilibus ornata, costa nervisque crispato-puberula, nervis lateralibus utrinque 5–6 supra conspicuis subtus prominentibus, nervis transversis supra subobscuris subtus subprominulis; petioli foliorum oppositorum parum inaequales, 0·5–1·5 cm. longi, crispatim puberuli. *Spicae* et axillares et terminales, saepe in paniculam terminalem dispositae, longius pedunculatae, ad 5 cm. longae; bracteae oblongo-cuneatae, parum retusae, 8·5 mm. longae, 3 mm. latae, pilis longis glandulosis hic illic instructae; bracteolae bracteis similes sed minores. *Calyx* bilabiatus; labium anticum e segmentis duobus fere e basi liberis spatulatis retusulis 10·5 mm. longis circiter 2 mm. latis ciliolatis constitutum, posticum 3-lobatum, 9 mm. longum. *Corolla* purpurea (ex *Kerr*), 3 cm. longa. *Capsula* vix 1 cm. longa; semina orbicularia, compressa, 1·25 mm. diametro, pilis hygroscopicis vestita.

Between Lakon and Phre, near Ban Meh Tah, by streams, 300 m., *Kerr*, 995.

**Justicia chlorantha**, *Craib* [Acanthaceae-Justicieae]; ab affini *J. flaccida*, Kurz, petiolis haud alatis, inflorescentia spiciformi plerumque simplice facile distinguenda.

*Caules* circiter 6 dm. alti, basi lignosi, primo unilateraliter pubescentes, mox glabri, subvirides, striati. *Folia* late ovata, ovato-oblonga vel ovato-lanceolata, apice acuminata, obtusiuscula, basi

rotundata, vel fere truncato-cuneata, 10–21·5 cm. longa, 5·7–10·5 cm. lata, membranacea, utrinque fere glabra, supra sicco viridia, subtus pallidiora, nervis lateralibus utrinque 9–10 supra conspicuis subtus prominentibus, nervis transversis pagina utraque conspicuis; petioli foliorum oppositorum parum inaequales, ad 6·5 cm. longi, supra canaliculati et pilis crispis brunneis in lineas duas dispositis instructi. *Cymae* oppositae, in racemum terminalem spiciformem plerumque simplicem 10–17 cm. longum internodiis infimis 3 cm. longis dispositae; pedunculus communis circiter 4 cm. longus, ut rhachis unilateraliter crispatim pubescens; bracteae bracteolaeque parvae. *Calyx* 2 mm. longus, lobis 5 acutis ciliolatis. *Corolla* viridis (ex *Kerr*), 5·5 mm. longa; labium posticum erectum, emarginatum, anticum 3-lobatum. *Stamina* subinclusa. *Capsula* oblonga, circiter 1 cm. longa, inferne in stipitem contracta, parce pubescens. *Semina* depresso-globosa, circiter 2 mm. diametro, verrucosa.

Meh Ping Rapids, Ban Kaw, in mixed jungle, *Kerr*, 2023.

**Justicia decumbens**, *Craib* [Acanthaceae-Justicieae]; ab *J. flaccida*, Kurz, petiolis haud vel vix alatis facile distinguenda.

*Caules* decumbentes, nodis inferioribus radicantes, primo bifaciaaliter pubescentes, mox glabri. *Folia* elliptica vel ovato-lanceolata, apice acuminata, obtusa, basi attenuata, 6–18 cm. longa, 2·6·5 cm. lata, membranacea, utrinque fere glabra, supra lineolata, subtus pallidiora, nervis lateralibus utrinque circiter 8 supra conspicuis subtus prominulis, nervis transversis utrinque conspicuis, petiolis ad 4 cm. longis supra canaliculatis parce pubescentibus suffulta. *Panicula* terminalis, ei *J. flaccidae* similis; bracteae bracteolaeque parvae. *Calyx* 2 mm. longus, lobis lineari-lanceolatis acutis ciliolatis. *Corolla* alba nisi labio antico purpureo-picto (ex *Kerr*), 1·5 cm. longa; labium posticum erectum, anticum breviter 3-lobatum. *Stamina* 2, subinclusa.

Chiengmai, Doi Kum, by stream, 330 m., *Kerr*, 1658.

**Amorphophallus corrugatus**, *N. E. Brown* [Aroideae-Pythonieae]; affinis *A. Kerrii*, N. E. Brown, sed ovariis atropurpureis, stylis longioribus, appendice valde corrugata facile distinguitur.

*Herba* tuberosa, perennis. *Folium* ignotum. *Pedunculus* 25–55 cm. longus, ad 1 cm. crassus, sordide viridis et albido-variegatus et fusco-punctatus. *Spatha* erecta, 7–15 cm. longa, 3–7 cm. lata, cucullata, apice leviter procurva, obtusa, basi brevissime convoluta, marginibus leviter undulatis, glabra, extra viridis versus basin albido-variegata, marginibus purpureo-tinctis, intra albida, apice viridis, marginibus purpureis. *Spadix* spatha multo brevior, stipitata; stipes albus; pars feminea 1·5–3 cm. longa, ad 1·8 cm. crassa, cylindrica, fusco-purpurea; ovarium globosum, in stylum 2–3 mm. longum abrupte contractum, stigmate punctiformi; pars mascula 1·5–2 cm. longa, ad 1·4 cm. crassa, cylindrica, roseo-tincta vel carnea; appendix 1·5–3 cm. longa, ad 2 cm. crassa, irregulariter ovoidea, obtusa, profunde corrugata, sordide ochracea.

Chiengmai, Doi Sootep, 1500 m., *Kerr*, 1105.

Described from a living plant sent by Dr. A. F. G. Kerr to Trinity College Botanic Garden, Dublin, where it flowered in April, 1912.

## XXXII.—DIAGNOSES AFRICANAE, XLIX.

1361. **Amphithalea Bodkinii**, *Dümmer* [Leguminosae-Genisteae]; ab *A. densa*, Ecklon et Zeyher, foliis brevioribus valde latioribus vix acutis, floribus fere duplo minoribus distinguitur.

*Frutex* decumbens? undique corollis exceptis dense argenteo-sericeus, caulibus ad 35 cm. longis teretibus basi 4 mm. crassis; ramuli laterales conferti, brevissimi vel ad 5 cm. longi, dense foliosi. *Folia* imbricata, late ovata vel elliptica, brevissime cuspidata aut fusco-mucronata, basi rotundata vel paullulo angustata, 6–9 mm. longa, 5–8 mm. lata, valde coriacea, dorso costa prominente sed nervis lateralibus obsoletis. *Flores* singuli in axillis foliorum superiorum dispositi et ea excedentes, brevissime pedicellati, sicco rosei; bracteae subulatae, tubo triplo aut quadruplo breviores. *Calyx* extra pubescens, 5 mm. longus, lobis anguste triangularibus tubo vix aequalibus. *Corolla* glabra; vexillum unguiculatum, 8–9 mm. longum, 4 mm. latum, lamina late obovata emarginata basi auriculata, ungue anguste cuneato lamina duplo breviore; alae graciliter unguiculatae, 8–9 mm. longae, 2 mm. latae, limbis suboblongis rotundatis subauriculatis; carinae lamina anguste falcato-oblonga, rotundata, auriculata; ungues 2 mm. longi. *Pistillum* villosulum, apicem versus glabrum, stigmate truncato.

South Africa. Coast Region: Paarl Div.; on the mountains about French Hoek, 960 m., *Bodkin in Herb. Bolus*, 8622.

1362. **Coelidium amphithaleoides**, *Dümmer* [Leguminosae-Genisteae]; *C. muraltioidi*, Bentham, affine sed foliis arrectis brevioribus haud tortuosis dorso fere carinatis, spicis longioribus magis cylindricis facile distinguendum.

*Fruticulus* ad 40 cm. altus, habitu *Amphithaleae ericaefoliae*, Ecklon et Zeyher, sed laxiuscule ramosus et minus foliosus; rami graciliter arcuati, angulati, juventute foliis obtecti, albo-villosuli. *Folia* arrecta, subimbricata, ericoidea, lanceolata, obtusa, 3 mm. vix excedentia, dorso fere carinata, mox glabra lucidaque, intra concava, dense pubescentia. *Spicae* terminales, cylindricae, 1–2·5 cm. longae, floribus purpureis bracteas foliaceas ovatas valde excedentibus. *Calyx* extra pubescens, 5–6 mm. longus, dentibus deltoideis tubo duplo brevioribus. *Corolla* glabra; vexillum breviter unguiculatum, 5–6 mm. longum, lamina fere quadrata; alae graciliter unguiculatae, 6–6·5 mm. longae, laminis oblongis rotundatis basi truncatis, carina alis simili sed auriculata. *Stylus* rectus, filiformis, glaber, stigmate oblique truncato.

South Africa. Central Region: Ceres Div.; on stony slopes at Gydouw Pass, 840 m., *Bolus*, 7346 and 1040.

A remarkably distinct species with the aspect of *Amphithalea ericaefolia*, Ecklon and Zeyher.

1363. **Coelidium euchaetioides**, *Dümmer* [Leguminosae-Genisteae]; *C. Bowiei*, Bentham, affine sed foliis brevioribus carnosulis subteretibus obtusis haud pungentibus, calycibus pubescentibus distinctum.

*Fruticulus* ericoideus; rami angulati, primo pubescentes, mox glabri castaneique; ramuli florentes laterales brevissimi vel ad 3 cm. longi, foliis obtecti. *Folia* saepe subimbricata, arcuato-ascendentia, teretiuscula, carnosula, supra profunde canaliculata, obtusa, 4–4·5 mm.

longa, mox praeter sulcam glabra. *Flores* brevissime pedicellati, solitarii vel in capitula terminalia 2–6-flora congesti; bracteae ovatae, parvulae, pubescentes. *Calyx* extra pubescens, lobis triangularibus obtusis tubum aequantibus. *Corolla* glabra; vexillum cuneatum, rotundatum, 8 mm. altum, 4·5 mm. latum; alae graciliter unguiculatae, 6–7 cm. longae, limbis suboblongis rotundatis basi truncatis; carina alis similis, auriculis ornata. *Ovarium* subsericeum, uniovulatum, stylo recto glabro longiusculo; stigma simplex.

South Africa. Coast Region: Clanwilliam Div.; on the Cederberg Range near Clanwilliam, *Bolus in Herb. Bolus*, 8966.

The specific name implies the close resemblance this species bears to *Euchaetis ericoides*, Dümmer.

1364. **Argyrolobium aciculare**, *Dümmer* [Leguminosae-Genisteae]; *A. filiformi*, Ecklon et Zeyher, affinis sed glabrior et floribus duplo minoribus.

*Radix* tuberosa (fide *Bolus*); *caules* annui, florentes stricti aut subflexuosi, interdum simplices, gracillimi, laxe foliati, teretes, ad 15 cm. alti. *Folia* ascendentia, trifoliolata; petioli teretiusculi, ad 7 mm. longi; foliola filiformi-acicularia, pungentia, supra profunde sulcata, subsericea, mox glabrescentia, ochraceo-viridia, inter se aequilonga vel terminalia caeteris paullulo longiora, ad 4 cm. longa; stipulae geminae, arrectae, subulatae, 2 mm. vix excedentes. *Inflorescentia* axillaris vel terminalis, uniflora vel saepius umbellatim 3–5-flora, pedunculis nudis ad 1·3 cm. longis; bracteae bracteolaeque arrectae, subulatae, 2·5–3 mm. longae. *Calyx* cum pedicello circiter 1 cm. longus, argenteo-sericeus. *Vexillum* late subcuneatum, rotundatum, inferne margine involutum, 8 mm. longum, 5 mm. latum, postice superne subsericeum; unguis fere obsoletus; alae rectae, oblongae, rotundatae, basi truncatae, 5 mm. longae, 2 mm. latae; ungues circiter 1 mm. longi; carina alis similis, sed paullulo brevior et magis curvata, glabra. *Ovarium* ad suturam ventralem et apicem versus sericeum, stylo valde arcuato glabro ovario duplo breviore, stigmate subcapitato.

South Africa. Coast Region: Caledon Div.; on the slopes of a mountain at Houw Hoek, 300–690 m., *Bolus*, 6934.

1365. **Argyrolobium Muddii**, *Dümmer* [Leguminosae-Genisteae]; a *A. transvaalensi*, Schinz, foliolis ellipticis, floribus majusculis distinguitur.

*Herba* lignosa, ad 40 cm. alta, parce ramosa, ramis subfastigiatis laxe foliatis teretiusculis fusco-sericeis. *Folia* trifoliolata; petioli 2–4 mm. longi; foliola internodiis aequilonga vel duplo breviora, elliptica, apiculata aut obtusa, supra mox fere glabra, subtus fusco-sericea et costa prominula, subcoriacea, inter se aequilonga aut terminalia caeteris paullo longiora, circiter 2·5 cm. longa, 0·8–1·2 cm. lata; stipulae binae, arrectae, subulatae, petiolos fere aequantes. *Racemi* terminales, pauci, recti, 5–7-flori, pedunculis inferne fere nudis ad 9 cm. longis; bracteae subulatae, pedicellos fere aequantes aut iis breviores; bracteolae nullae vel minutissimae. *Flores* aurantiaci (fide *Mudd*), pedicellis ad 8 mm. longis et cum calycibus fulvo-sericeis. *Calycis* labium inferius circiter 1 cm. longum. *Corolla* glabra; vexillum brevissime unguiculatum, lamina ampla reflexa fere orbiculari 1·3–1·5 cm. diametro; alae oblique late-oblongae,

rotundatae, 1 cm. longae, 5–6 mm. latae ; ungues brevissimi ; carina navicularis, obtusa, basi auriculata, 6 mm. longa, 5 mm. lata. *Ovarium* hirsutulum, stylo arcuato ovarium fere aequante.

South Africa. Kalahari Region: Transvaal; summit of Mount MacMac, *Mudd*.

1366. Argyrolobium natalense, *Dümmer* [Leguminosae-Genisteae]; *A. longifolio*, Walpers, peraffine, sed glabrescens et racemis gracilioribus.

*Frutex* gracilis, circiter metralis, laxe distiche ramosus, in sicco nigrescens, ramis lateralibus ascendentibus teretibus sulcatis superne laxe foliatis mox glabris. *Folia* trifoliolata ; petioli circiter 1 cm. longi ; foliola saepissime conduplicata, lineari-lanceolata, acuminata aut acutata, terminalia ad 4·5 cm. longa, 4–5 mm. lata, lateralia caeteris paullo breviora, fere glabra, subcoriacea ; stipulae solitariae, subulatae, 2 mm. vix excedentes, deciduae. *Racemi* terminales, plurimi, ascendentes, interdum secundi, graciliter 5–12-flori, floribus patentibus brevissime pedicellatis flavidis ; bracteae subulatae, pedicellos aequantes ; bracteolae subulatae, ad 2 mm. longae. *Calyx* extra subsericeus, mox glaber, 5–7 mm. longus. *Vexillum* 8–9 mm. longum, 7–8 mm. latum, rotundatum, emarginatum, a medio in unguem sensim angustatum, postice circa costam fulvido-sericeum ; alae brevissime unguiculatae, 8 mm. longae, fere glabrae, limbis suboblongis rotundatis basin versus paullulo angustatis auriculatis ; carinae lamina navicularis, acutata, 6 mm. longa, 3 mm. lata, glabra ; ungues 2 mm. longi. *Legumen* lineari-oblongum, fere rectum, complanatum, 5–6 cm. longum, 3 mm. latum, subsericeum, 12–15-spermum, seminibus brunneis.

South Africa. Eastern Region: Natal; Itafamasi, Inanda, *Wood*, 861.

A species with the facies of *A. longifolia*, Walpers, but easily distinguished by its glabrescent character and more slender racemes.

A specimen collected by *Wood* (3847) near Northdene agrees with *A. longifolia*, Walpers.

1367. Argyrolobium nigrescens, *Dümmer* [Leguminosae-Genisteae]; *A. tuberoso*, Ecklon et Zeyher, remote affinis, sed foliolis brevioribus, floribus oppositifoliis solitariis recedit.

*Herba* rhizomate lignescente perennans, sicco nigrescens, caulibus annuis florentibus decumbentibus aut strictis gracilibus parce foliatis 12 cm. vix excedentibus sericeis inferne nudis. *Folia* erecta, trifoliolata, brevissime petiolata, internodiis saepissime breviora ; foliola lineari-lanceolata, acuminata, inter se aequilonga vel terminalia caeteris longiora, 2–5·5 cm. longa, 2–3 mm. lata, supra mox glabra, subtus grisco-sericea, subcoriacea, costa prominula ; stipulae geminatae, falcato-subulatae, circiter 5 mm. longae. *Flores* solitarii, oppositifolii, flavidi (fide *Wood* et *Sankey*), pedunculis ad 5 mm. longis ; bracteae filiformes, 2 mm. longae. *Calyx* circiter 8 mm. longus, extra villosulus. *Vexillum* brevissime unguiculatum, lamina orbiculari ad 1 cm. diametro dorso superne subsericea ; alae suboblongae, rotundatae, vix auriculatae, in toto 8 mm. longae, 3 mm. latae ; ungues perbreves ; carinae lamina oblique navicularis, obtusa, basi truncata, 6 mm. longa, 3–4 mm. lata, glabra ; ungues 2 mm. longi. *Ovarium* ad suturam ventralem et apicem versus hirsutulum, stylo erecto glabro, stigmate capitato.

South Africa. Kalahari Region: Orange River Colony; Harrismith, *Sankey*, 56. Basutoland, *Cooper*, 2179. Eastern Region: Natal; Van Reenen's Pass, 1500–1800 m. *Wood*, 4517.

1368. **Argyrolobium podalyrioides**, *Dümmer* [Leguminosae-Genisteae]; *A. collino*, Ecklon et Zeyher, peraffinis, sed foliolis multo latioribus fere truncatis, floribus majusculis distincta.

*Planta* perennis, undique corollis exceptis valde argenteo-sericea; *caules* annui, stricti, fere simplices, lignescentes, graciliusculi, parce foliosi, ad 30 cm. alti. *Folia* erecta, trifoliolata, saepe internodiis breviora; petioli perbreves vel ad 8 mm. longi; foliola late cuneata, truncata et brevissime cuspidata vel brevissime rotundato-cuspidata, terminalia 1–1·5 cm. longa, 0·8–1·2 cm. lata, caeteris paullo brevioribus vel interdum aequilongis, subtus obsolete costata, coriacea; stipulae binae, arrectae aut patentes, deltoideae, minutissimae. *Flores* singuli, oppositifolii, brevissime pedicellati vel in umbellas terminales 2–3-floras aggregati, bracteis subulatis. *Calyx* extra argenteo-sericeus, circiter 1 cm. longus. *Vexillum* brevissime unguiculatum, late cuneatum, rotundatum, 1·3 cm. longum, 1·2–1·3 cm. latum, postice sericeum; alae oblongae, rotundatae, auriculatae, 1 cm. longae, 4 mm. latae, glabrae; ungues 1·5 mm. longi; carina navicularis, obtusa, 8–9 mm. longa, 4–4·5 mm. lata, basi truncata, glabra. *Ovarium* sericeum, stylo arcuato glabro.

South Africa. Coast Region: Albany Div.; on grassy hills near Grahamstown, 600 m. *MacOwan*, 481. Bothas Berg, 660 m. *MacOwan*, 481. Grahamstown, *Tyson*.

1369. **Argyrolobium rarum**, *Dümmer* [Leguminosae-Genisteae]; *A. Harveiano*, Oliver, affine, sed humilius, petiolis longioribus, foliolis brevioribus anguste ellipticis differt.

*Herba* annua? erecta, inferne ramosa, circiter 11 cm. alta, ramis graciliusculis simplicibus ascendentibus parce fulvido-sericeis. *Folia* ascendentia, trifoliolata, internodiis breviora aut longiora; petioli 0·8–1·2 cm. longi, supra canaliculati; foliola anguste elliptica, utrinque angustata, acuta, supra mox glabra, subtus parce sericea, costa fere obsoleta, vix coriacea, terminalia ad 1·7 cm. longa, 2 mm. lata, lateralia paullo breviora; stipulae binae, arrectae, subulatae, petiolis duplo aut quadruplo breviores. *Flores* singuli vel bini, oppositifolii, flavidi, pedicellis ad 8 mm. longis, bracteis lanceolatis pedicellis duplo brevioribus. *Calyx* extra subsericeus, ad 7 mm. longus, laciniis lanceolatis acuminatis. *Corolla* glabra; vexillum brevissime unguiculatum, in toto 1 cm. altum, lamina late triangulari acutata inferne rotundata; alarum ungues graciles, 3 mm. longi; limbi naviculares, obtusi, basi truncati, 6 mm. longi, 3 mm. lati; carina alis similis sed minor angustiorque, auriculis parvulis ornata. *Ovarium* suturis sericeis, stylo valde arcuato glabro ovarii longitudinem excedente, stigmate horizontaliter subcapitato.

South Africa. Coast region: Albany Div.; Grahamstown, Hell Poort, *MacOwan*, 940 (or 946?).

1370. **Argyrolobium Sankeyi**, *Dümmer* [Leguminosae-Genisteae]; ab *A. stipulaceo*, Ecklon et Zeyher, foliolis ellipticis haud sericeo-nitidis, stipulis parvulis distinguitur.

*Planta* perennis, e basi lignescente ramosa, ramis florentibus ascendentibus dense foliosis ad 15 cm. altis valde villosulis. *Folia*

ascendentia, trifoliolata ; petioli supra profunde sulcati, ad 5 mm. longi ; foliola elliptica vel late-elliptica, utrinque acutata, terminalia 1·5–1·7 cm. longa, 0·9–1·3 cm. lata, lateralia paullo breviora, utrinque albo-villosulo-sericea, subtus costa prominente, subcoriacea, viridia, margine creberrime et breviter ciliata ; stipulae binae, falcato-lanceolato-subulatae, petiolos fere aequantes. *Inflorescentia* solitaria, pedunculata, 3–5-flora floribus flavidis umbellatim aggregatis ; pedunculus 0·8–2 cm. longus, villosulus ; pedicelli perbreves ; bracteae stipulis similes sed breviores. *Calyx* 1–1·2 cm. longus, extra hirtellus. *Vexillum* brevissime unguiculatum, lamina fere rotundata circiter 1·2–1·3 cm. diametro dorso valde costata et sericea ; alae rectae, oblongae, rotundatae, truncatae aut obtusae, 1 cm. longae, 4 mm. latae, frontem versus subsericeae, unguibus perbrevibus ; carinae limbus late navicularis, obtusus, apicem versus paullulo barbatus. *Stylus* valde arcuatus, ovarium subaequans. *Legumen* immaturum, rectum, lineare-oblongum, compressum, villosulum, 3 cm. longum.

South Africa. Kalahari Region : Orange River Colony ; Harrismith, *Sankey*, 43.

1371. **Argyrolobium Woodii**, *Dümmer* [Leguminosae-Genisteae] ; facie *A. nigrescentis*, Dümmer, sed caulibus altioribus, stipulis majusculis, inflorescentiis racemose 3-floris, floribus purpureis.

*Caules* florentes annui, fere stricti, simplices, ad 30 cm. alti, villosuli. *Folia* erecta, trifoliolata, internodiis saepe duplo longiora ; foliola saepissime conduplicata, lineari-lanceolata, acuminata, terminalia, ad 4 cm. longa, 3 mm. lata, caeteris longiora, utrinque sericeo-villosula, dorso costata, coriacea ; petioli circiter 5 mm. longi, villosuli ; stipulae geminatae, arrectae, lanceolatae, cuspidato-acuminatae, ad 2 cm. longae. *Racemi* terminales, solitarii, 3-flori ; pedunculi 3 cm. longi, villosuli. *Flores* breviter pedicellati, purpurei (fide *Wood*), bracteis subulatis villosulis ad 6 mm. longis. *Calyx* extra villosulus, circiter 1 cm. longus, laciniis superioribus lanceolatis cuspidato-acuminatis. *Vexillum* brevissime unguiculatum, limbo reniformi-orbiculari 1 cm. lato postice ad costam et superne sericeo ; alae auguste longitudinaliter obovatae, basin versus angustatae et auriculis ornatae, 9 mm. longae, glabrae ; ungues vix 1 mm. longi ; carina brevissime unguiculata, tota 7 mm. longa, apicem versus ampliata, 3·5–4 mm. lata et pilos paucos gerens, basin versus abrupte attenuata, vix auriculata. *Stylus* fere geniculatus, glaber, ovario hirsuto brevior, stigmate oblique subcapitato.

South Africa. Eastern Region : Natal ; Liddesdale, 1200–1500 m., *Wood*, 3937.

1372. **Indigofera setosa**, *N. E. Brown* [Leguminosae-Indigoferae] ; affinis *I. heterotrichae*, DC., sed foliis mucronatis, racemis brevioribus et floribus paucioribus facile distinguitur.

*Herba* 30–60 cm. alta. *Caules* erecti, ramosi, basi lignosi, dense setulosi ; setulae patulae, subflaccidae, apice minute glanduliferae. *Folia* 1–2 cm. longa, brevissime petiolata, imparipinnata ; foliola opposita, 2–3-juga, 0·4–1·2 cm. longa, 1·5–4·5 mm. lata, oblonga, utrinque acuta vel obtusa, apice mucronata, utrinque pilis adpressis medio affixis parce pubescentia, rhachi in costa infra et interdum marginibus plus minusve setulosa. *Stipulae* subulatae, 1·5–6 mm. longae. *Racemi* axillares, pedunculati, 3–6-flori ; pedunculi 1–2·5 cm. longi, setulosi ; partes floriferae 4–6 mm. longae. *Bracteae*

subulatae. *Pedicelli* brevissimi, subglabri. *Calyx* profunde 5-lobus, setulosus; tubus vix 1 mm. longus; lobi 3 mm. longi, subulati. *Corolla* 4 mm. longa; vexillum orbiculari-ovatum, breviter unguiculatum, dorso pilis adpressis medio affixis minute pubescens; alae oblique subspathulato-obovatae, obtusae, glabrae; carina acuta, apice parce puberula. *Legumen* lineare, pilis minutissimis medio affixis adpresse puberulum et plus minus setulosum.

South Africa. Natal; on a grassy hill at Umhloti, *Wood*, 1602.

This species is also allied to that which in the Flora Capensis, vol. ii, p. 196, is described under the name *I. seticulosa*, Harv., which I take this opportunity of pointing out should be altogether erased from the South African Flora. For *I. seticulosa* was founded upon a specimen collected by Armstrong and doubtfully localised as being from the Cape of Good Hope. But I find it is identical with *I. viscosa*, Lam., an Australian species, under which *I. seticulosa*, Harv. must rank as a synonym, the type specimen being identical with Armstrong's No. 385, collected at Port Essington, and doubtless belongs to that gathering.

1373. **Crassula densa**, *N. E. Brown* [Crassulaceae]; species distinctissima, affinitate dubia.

*Herba* succulenta, 4–6 cm. alta, dense ramosa. *Folia* ad apicem ramorum conferta, 6–8 mm. longa, 4–8 mm. lata, 3–7 mm. crassa, basi connata, ovoideo-subtrigona vel elliptico-subtrigona, obtusa vel subacuta, supra leviter convexa, subtus valde convexa et subcarinata, viridia, minute albido-subtuberculata, tuberculis minutissime pruinato-papillosis. *Pedunculus* terminalis, 3 cm. longus, gracilis, minutissime pruinoso-puberulus, bractearum minutarum paribus duobus distantibus instructus. *Flores* sessiles, parvi, in cymam capituliformem 1 cm. diametro congesti. *Calyx* 2 mm. longus, puberulus; lobi 1·5 mm. longi, subulato-lanceolati, acuti. *Corolla* 2·5 mm. longa, gamopetala, infra medium 5-loba, alba; lobi 1·8 mm. longi, oblongi, apice obtusi, plani, recurvi. *Stamina* inclusa; filamenta alba; antherae rubrae, polline luteo. *Squamae hypogynae* late obcuneatae, truncatae vel emarginatae, luteae. *Carpella* staminibus subduplo breviora, pallide viridia; stigma sessile, intense rubrum.

South Africa. Collected during the Percy Sladen Expedition to the Orange River in 1910 by *Prof. Pearson*, No. 6151.

Described from a living plant which flowered at Kew, December 6th, 1911. When dried the largest leaves shrink to the dimensions of about 5 mm. long and 2·5 mm. broad, and become elliptic, elliptic-obovate or suborbicular.

1374. **Crassula inamoena**, *N. E. Brown* [Crassulaceae]; affinis *C. paniculatae*, Dietr., sed foliis angustioribus subdistichis basi supra carinatis et eciliatis facile distinguitur.

*Herba* succulenta, subacaulis, caespitoso-ramosa. *Folia* radicalia 6–8, opposita, oblique subdistiche rosulata, conferta, recurvato-patula, carnosa, subflaccida, 4–8 (in cultura usque ad 10) cm. longa, 1–1·5 cm. lata, 5–8 mm. crassa, late linearia vel subattenuata, obtusa vel acuta, supra infra medium plana leviter medio-carinata, supra medium leviter convexa, subtus valde convexa, glabra, haud ciliata, impresso-punctata, viridia, subnitida. *Pedunculus* 15–18 cm. longus,

medio bractearum pare instructus, glaber. *Bracteae* folia reducta simulantes, 1·5–1·8 cm. longae, suberectae, basi connatae. *Flores* sessiles, in capitula vel cymas capituliformes 1·2–1·5 cm. diametro dense conferti ; capitula inferiora pedunculata, superiora sessilia vel subsessilia. *Sepala* 2 mm. longa, oblonga, obtusa, dorso valde convexa, glabra, ciliata, atrovirentia. *Petala* conniventi-erecta, 3 mm. longa, 1·6–1·7 mm. lata, basi connata, obovata, obtusa, dorso pone apicem apiculo conico obtuso crasse-carnoso instructa, glabra, alba. *Stamina* inclusa, glabra ; filamenta alba ; antherae lutcae. *Glandulae hypogynae* subquadrangulares, truncatae, aurantiacae. *Carpella* in stylum brevissimum attenuata ; stigma magnum, viride.

South Africa. Collected during the Percy Sladen expedition to the Orange River in 1910 by *Prof. Pearson*, No. 5486.

Described from a living plant which flowered at Kew in March, 1912.

1375. **Cotyledon procurva**, *N. E. Brown* [Crassulaceae] ; affinis *C. triflorae*, Haw., sed foliis longe cuneatis multo angustioribus et floribus procurvis facile distinguitur.

*Herba* nana, succulenta, perennis, glabra. *Folia* alterna, laxa, adscendentia, 3–5 cm. longa, apice 1·5–2·2 cm. lata, 7–8 mm. crassa, anguste cuneata, apice subtruncata et deinde in petiolum teretem 5–15 mm. longum cuneato-attenuata, laevia, epunctata, olivaceo-viridia vel purpureo-tincta, glauca. *Pedunculus* terminalis, 2–3 cm. longus, 2 mm. crassus, simplex, inferne nudus, superne laxe spicatus, sordide purpureus, glaucus. *Flores* alterni, solitarii vel bini vel terni, subsessiles, minutissime bracteati. *Calyx* 2·5 mm. longus, minute et acute 5-dentatus, viridis, glaucus. *Corolla* procurva, in gemma peracuta ; tubus 1 cm. longus, cylindricus, sordide purpureus ; lobi 4–4·5 mm. longi, patentes vel recurvi, lanceolati, acuti, pallide roseo-purpurei.

South Africa. Locality and collector unknown. Described from a living plant which flowered at Kew, August 30th, 1911.

1376. **Callitriche compressa**, *N. E. Brown* [Haloragaceae] ; affinis *C. deflexae*, A. Br., sed caulibus ancipitibus et carinis fructus non productis differt.

*Herba* aquatica, submersa, glabra. *Caulis* valde compressus, anceps. *Folia* uniformia, 4–10 mm. longa, 1–2 mm. lata, obovato-spathulata, obtusa. *Fructus* minutus, 0·70–0·75 mm. longus et latus, subquadrato-orbicularis, angulis subacute carinatis, sulco dorsali acuto. *Stigmata* quam fructus duplo breviora, deflexa, persistentia.

South Africa. Natal ; in a stagnant pool at Umbilo, *Miss Franks in Herb. Wood*, 11943.

1377. **Eugenia pusilla**, *N. E. Brown* [Myrtaceae-Myrteae] ; affinis *E. albanensi*, Sond., ei habitu simillima, sed foliis anguste lineari-lanceolatis facile distinguitur.

*Herba* perennis, 10–15 cm. alta. *Caules* annui, fasciculati, erecti, graciles, 0·6–0·7 mm. crassi, glabri. *Folia* opposita vel alterna, suberecta vel leviter patula, brevissime petiolata, 2–3·5 cm. longa, 2–3 mm. lata, anguste lineari-lanceolata, acuta, basi attenuata, uninervia, pellucido-punctata, marginibus revolutis, glabra. *Flores* solitarii, ex axillis foliorum inferiorum enati, omnino glabri. *Pedicelli* 1–2 cm. longi, graciles, apice bibracteati. *Bracteae* 2 mm.

longae, lineares, recurvae. *Sepala* 4, 2 mm. longa, latissime ovata, acuta. *Petala* delapsa. *Stamina* 3·5 mm. longa, incurva. *Ovarium* breviter obconicum.

South Africa. Transvaal: near Amsterdam, in Ermelo District, *Forbes*.

This species, although closely allied to *E. albanensis*, Sond., is so different from a *Eugenia* in general appearance, that until the flowers were examined would scarcely be suspected of belonging to that genus. It is locally known as "*Lomo*," and is suspected of poisoning sheep in the Ermelo District.

1378. **Mesembryanthemum Pearsonii**, *N. E. Brown* [Ficoideae-Mesembryeae]; affinis *M. testiculari*, Ait., sed foliis multo majoribus, calyce supra folia exserto, floribus minoribus bicoloribus differt.

*Herba* succulenta, 4–5 cm. alta. *Folia* 2, basi connata, adscendenti-patula, 3·5–4 cm. longa, 4·5 cm. lata, 2·5 cm. crassa, supra subplana marginibus acutis, dorso convexa, subgibbosa, leviter carinata, apice leviter convexa, laevia, glabra, alba nec glauca. *Flores* solitarii, inter folia terminales. *Pedunculi* validi, compressi, exserti, 2·5 cm. longi, quadribracteati. *Bracteae* inferiores foliis arcte contiguae, 1·5 cm. longae, 8 mm. latae, 8 mm. crassae, superiores minores, subacute trigonae, obtusae, laeves, glabrae, albae. *Calyx* 1·3 cm. diametro, 6-lobus, glaber; lobi 3–4 mm. longi, 5 mm. lati, latissime ovati, obtusi. *Corolla* 3–3·2 cm. diametro; petala 3–4-seriata, exteriora 1·3 cm. longa, lineari, obtusa, purpurea, interiora gradatim breviora, sordide lutea, rubro-vittata. *Stamina* numerosissima, patula, in annulum dense conferta; filamenta albida; antherae pallide luteae. *Styli* nulli; stigma sessile, discoideum, 5 mm. diametro, subcrenatum vel obscure lobatum.

South Africa. Probably a native of Little Namaqualand, collected during the Percy Sladen Expedition to the Orange River in 1910 by *Prof. Pearson*, No. 5482.

Described from a living plant sent by Prof. Pearson to Kew, where it flowered in November 1911. This species resembles *M. testiculare*, Ait., on a large scale, and differs from all others of which I have examined flowers in having a large discoid sessile stigma. The flowers expand at night or early morning, and are closed or partly closed during the day, and in colour are somewhat peculiar, the outer series of petals being mauve-purple, whilst 2–3 of the inner series are of a somewhat dull yellow, more or less streaked with purple.

1379. **Sphenoclea Dalzielii**, *N. E. Brown* [Campanulaceae]; species a *S. zeylanica*, Gaertn., spicis minoribus subglobosis vel breviter oblongis nec conicis et corolla quam lobis calycis duplo longiore differt.

*Herba* 0·3 m. alta, glabra, caule debili curvato vel flexuoso pauce ramoso. *Folia* alterna, patentia, subsessilia, 2–2·6 cm. longa, 6–11 mm. lata, oblonga vel obovato-oblonga, apice rotundata, basi cuneata. *Spicae* saepe foliis oppositae, 5–15 mm. longae, 5–7 mm. crassae, subglobosae vel oblongae, obtusae, nec conicae, pedunculatae, 10–25-florae. *Pedunculi* 0·4–1·1 cm. longi. *Sepala* 1·5 mm. longa et lata, suborbiculata, integra. *Corolla* sepalis duplo longior, campanulata, 5-loba; tubus 1·75–2 mm. longus; lobi 1 mm. longi,

oblongo-ovati, obtusissimi. *Stamina* inclusa ; filamenta 0·4 mm. longa ; antherae 0·4 mm. longae, 0·5 mm. latae. *Ovarium* apice depressum ; stylus brevissimus ; stigma simplex.

Northern Nigeria. Katagum district, *Dalziel*, 201.

During the 120 years that have elapsed since Gaertner established this remarkable genus, which more resembles a *Phytolacca* than one of the *Campanulaceae*, no second species has hitherto been added to it. The discovery of *S. Dalzielii* is therefore of more than ordinary interest. It differs from *S. zeylanica*, Gaertn., by its more flaccid stem, which seems to be of quite a different texture, much smaller and not conically pointed flower-spikes, a corolla twice as long as the calyx-lobes, stamens with filaments as long as (not shorter than) the anthers, and the latter broader than long, and much smaller than those of *S. zeylanica*.

1380. **Baissea breviloba**, *Stapf* [Apocynaceae-Echitideae] ; affinis *B. subsessili*, Stapf (*Oncinoti subsessili*, K. Schum.), sed indumento tenuiore, foliis praeter nervorum axillas et costas glabris, inflorescentiis tenuioribus minute bracteatis, floribus 4 mm. haud excedentibus brevius lobatis distincta.

*Frutex* scandens, ramis gracilibus rufo-pubescentibus vel villosulis *Folia* oblonga, breviter acuminata, acumine apiculato, basi subtruncato-rotundata, circiter 5 mm. longa, 1·5–2 cm. lata, subcoriacea, in costa et in nervorum axillis pilosa, caeterum glabra, nervis secundariis utrinque 4–5 infra prominentibus tenuibus, venis transversis inconspicuis ; petioli vix 2 mm. longi, pubescentes. *Cymae* in paniculas laxas subdivaricatas terminales et axillares foliis breviores dispositae, minute rufo-pubescentes ; bracteae lanceolatae, acutae, infimae 2 mm., caeterae 1 mm. longae ; pedicelli ad 3 mm. longi. *Calyx* minute pubescens, 1·5 mm. longus ; sepala late ovata, subacuta. *Corolla* late campanulata, 4 mm. longa, extra minute rufo-tomentella ; tubus intus supra staminum insertionem callis obtusis in annulum transversum confluentibus instructus, supra eam glaber, infra fasciculis pilorum argenteis ornatus ; lobi e basi ovata lanceolati, acuti, tubo aequilongi vel eo paululo breviores. *Antherae* 2 mm. longae. *Ovarium* in vertice rufo-pubescens ; stylus clavatus ; stigma apice bifidum.

Tropical Africa. Southern Nigeria. Ikpe, *Farquhar*, 1.

In Thiselton-Dyer's Flora of Tropical Africa, vol. vi. p. 613, I stated that K. Schumann's *Oncinotis subsessilis*, which at the time was not represented at Kew, would probably have to be referred to *Baissea*. Specimens received since have confirmed that view, and they suggest its insertion and that of the present species after *B. angolensis* in the arrangement adopted in the Flora of Tropical Africa.

1381. **Farquharia**, *Stapf* [Apocynaceae-Echitideae] ; genus novum habitu *Isonemati*, R. Br., simile, sed ob corollae lobos symmetricos et stamina ad tubum medium inserta et in eo tota inclusa plane distinctum, fructu seminibusque adhuc ignotis in tribu difficile disponendum.

*Calyx* parvus ; sepala 5, subaequalia, imbricata, obtusa ; glandulae intracalyculares 1–2, minutae. *Corolla* hypocraterimorpha ; tubus cylindricus, supra medium paulo ampliatus, ore vix constrictus, nudus ; lobi oblongi, obtusi, in alabastro dextrorsum obtegentes et leviter torti. *Stamina* sub medio tubo inserta, inclusa ; antherae in

conum conniventes, lineares, breviter acuminatae, acutae, ob appendices loculis aequilongos inferne liberos sagittatae, inter crura antice pulvino albo-pilosulo instructae; filamenta brevissima, in tubo breviter decurrentia, parte decurrente intus valde prominente. *Discus* 0. *Carpella* libera, densissime ferrugineo-tomentosa et pilis intricatis cohaerentia; stylus filiformis; stigma infra apiculum minutum incrassatum, 5-sulcatum, viscosum, antherarum basibus agglutinatum; ovula numerosa, in placenta intus prominente pluriseriata. *Fructus* et semina ignota.—*Frutex* scandens (?). *Folia* opposita, subcoriacea, tenuiter nervosa; glandulae axillares parvae, *Flores* in paniculam brevem corymbiformem dispositi.

F. **elliptica**, *Stapf*; species unica.

Tota praeter inflorescentiam et novellas tenuissime ferrugineo-furfuraceo-pubescentes glaberrima. *Rami* teretes, juniores crassiusculi medulla ampla. *Folia* paribus 3–4·5 cm. distantibus, elliptica vel rarius oblongo-elliptica, abrupte breviter obtusiuscule acuminata, basi rotundata vel brevissime attenuata, 7–10 cm. longa, 4–6 cm. lata, chartacea vel subcoricea, nervis lateralibus utrinque circiter 4 patulis tenuissimis infra marginem arcuatim connexis saepe inconspicuis; petiolus 3–5 mm. longus, supra profunde canaliculatus. *Inflorescentiae* rami primarii 2·5 cm., secundarii 0·5–1 cm., tertiarii circiter 2 mm. longi, cymas 3–1-floras gerentes; pedicelli 3 mm. longi; bracteae perlate ovatae, vix 1 mm. longae. *Calyx* vix 2 mm. longus, densissime tenuissime ferrugineo-puberulus; sepala ovata. *Corolla* in alabastro maturo 2·5 cm. longa, extra praeter basin glabram tenuiter papillosa, intra in limbo papillosa, caeterum glabra; tubus 16–17 mm. longus, supra medium 4–5 mm. latus; lobi 9–10 mm. longi, 4–5 mm. lati. *Antherae* cum appendicibus 5 mm. longae. Stylus circiter 9 mm. longus, minute verruculosus.

Tropical Africa. Southern Nigeria: Benin District; Mogumu, *J. H. J. Farquhar*, 8.

1382. **Omphalogonus nigritanus**, *N. E. Brown* [Asclepiadaceae-Periploceae]; affinis *O. calophyllo*, Baill., sed foliis brevioribus apice obtusioribus vel subtruncate rotundatis, cymis minoribus et lobis exterioribus coronae obtusissime gibbosis differt.

*Caulis* volubilis, glaber. *Folia* opposita, petiolata, glabra; petioli 2–3 cm. longi; laminae 6–10 cm. longae, 5–8 cm. latae, elliptico-ovatae vel elliptico-oblongae, apice obtusissimae vul subtruncato-rotundatae, breviter cuspidatae, basi cordatae vel subcordatae, siccatae subtus glaucae, venis nigris percursae. *Cymae* axillares, pedunculatae, 4–6 cm. diametro, glabrae. *Pedunculi* 1·5–1·7 cm. longi. *Bracteae* parvae, squamiformes. *Pedicelli* 3–5 mm. longi. *Sepala* 3 mm. longa, subrotunda, obtusissima. *Corolla* 2·5 cm. diametro, rotata, ad medium 5-loba, extra glabra, intra papillato-puberula, atro-purpurea?; discus patelliformis; lobi 9 mm. longi, 8 mm. lati, elliptico-oblongi, apice rotundati. *Coronae lobi* 5, antheris oppositi, bilobulati, lobulis antepositis; lobulus interior erectus, 1·5 mm. longus, subcuneato-oblongus, apice emarginatus, antice canaliculatus; lobulus posticus radiatus, corollae adnatus, valde compressus, apice in gibbum obtuse rotundatum 0·5 mm. longum elevatus. *Antherae* pilis longis hirsutae.

Tropical Africa. Southern Nigeria: without locality, *N. W. Thomas*, 1011.

When working out the Asclepiads for the Flora of Tropical Africa I had not seen a specimen of this genus, but afterwards specimens of *O. calophyllus*, Baill. were received at Kew, when I found that Baillon's description of the corona is erroneous, as this genus has not a double corona. The corona consists of 5 lobes opposite the anthers, but each lobe has a basal much compressed process radiating from it and adnate to the corolla-tube or disk and forming 5 partitions, which divide the tube into 5 pocket-like cavities. In *O. calophyllus* the apex of these partitions rises into an acute subulate point; in *O. nigritanus* it forms a rounded compressed hump. The inner part of the coronal-lobe is erect, cuneate-oblong, notched at the apex and channelled down the face in both species. The flowers of both dry black.

1383. **Caralluma corrugata**, *N. E. Brown* [Asclepiadaceae-Stapelieae]; species floribus solitariis concentrice corrugatis ab omnibus distinctissima.

*Caules* vel rami primarii superne multiramosi, glabri; ramuli siccati 2·5–8 cm. longi, 3–6 mm. crassi, conferti, 3–4-angulati; anguli dentibus parvis late deltoideis apice minutissime tomentellis instructi. *Flores* solitarii, terminales et infra apicem ramorum dispositi. *Pedicelli* 1–2 (fructu 4–8) mm. longi, glabri. *Sepala* 1·3–2 mm. longa, ovato-lanceolata, acuta vel acuminata, glabra. *Corolla* 1·9–2·1 cm. diametro, extra laevis, intra in tubo et disco concentrice corrugata et in lobis tuberculata, glabra, brunneo-purpurea (?); tubus campanulatus, 4 mm. longus; lobi patentissimi, 6–7 mm. longi, 7 mm. lati, deltoideo-ovati, acuti, marginibus recurvis. *Corona exterior* 10-dentata; dentes per paria antheris oppositi, erecti, 0·5 mm. longi, subulati, pilis paucis instructi. *Coronae interioris* lobi 0·75 mm. longi, subulato-lineares, obtusi, antheras aequantes et iis arcte incumbentes.

Tropical Africa. British Somaliland: without precise locality, *Drake Brockman*, 477, 478.

1384. **Caralluma Dalzielii**, *N. E. Brown* [Asclepiadaceae-Stapelieae]; affinis *C. adscendenti*, R. Br., sed duplo minor et corollae lobis longe ciliatis differt.

*Herba* succulenta, 15–28 cm. alta, e basi ramosa; rami erecti, tetragoni, basi 8 mm. crassi, deinde usque ad apicem gradatim attenuati, glabri, angulis dentatis; dentes in folia rudimentaria subulata 3–4 mm. longa transeuntes. *Flores* fasciculati, penduli; fasciculi axillares, 2–3-flori, secus partem superiorem ramorum laxe dispositi. *Pedicelli* 2–3 mm. longi, recurvi, glabri. *Sepala* 2 mm. longa, subulata, acuta, glabra. *Corolla* 1 cm. diametro, 5 loba; tubus 1·5 mm. longus, cupularis, glaber; lobi patuli, 4·5–5 mm. longi, 1·5 mm. lati, lanceolati, subulato-acuminati, replicati, extra glabri, intra pilis tenuissimis sparse pubescentes et pilis longis fusiformibus atropurpureis supra medium dense ciliati, basi albidi (vel lutescentes?) purpureo-maculati, superne atropurpurei. *Coronae* lobi exteriores 1–1·3 mm. longi, erecti, profunde bipartiti, segmentis subparallelis subulatis, fusco-purpurei, glabri; lobi interiores 0·6 mm. longi, antheris incumbentes, deltoideo-oblongi, obtusi, glabri, fusco-purpurei.

Tropical Africa. Northern Nigeria: Katagum District, *Dalziel*, 317; on rocky hills at Sokoto, sometimes planted near houses, native name "Karan Masallachi," *Dalziel*, 367.

Described from dried specimens and fresh material preserved in formalin. The fine and scanty pubescence on the inner face of the corolla-lobes is quite invisible on dried flowers that have been boiled for dissection, until all moisture has evaporated from the surface. The long hairs fringing the lobes are also very easily detached, and in the specimens examined were mostly only to be found in unopened buds.

1385. **Thorncroftia**, *N. E. Brown* [Labiatae-Ocimoideae]; genus novum affinis *Orthosiphoni*, Benth., sed corollae labio inferiore a basi tripartito et stigmate profunde bifido differt.

*Calyx* campanulatus, bilabiatus, fructifer horizontalis; labium superius ovatum, acutum, in tubum decurrens; labium inferius subaequaliter 4-dentatum, dentibus anguste deltoideis acutis. *Corolla* bilabiata; tubus longe exsertus, rectus, cylindricus; labium superius cuneato-oblongum, apice emarginatum; labium inferius a basi tripartitum, segmentis lateralibus lineari-lanceolatis subacutis, segmento medio concavo obtuso. *Stamina* 4, didynamia, declinata, ad os tubi corollae inserta, libera, exserta; antherae confluentes uniloculares. *Discus* parvus, antice in glandulam tumens. *Stylus* apice aequaliter bifidus. *Nuculae* subellipsoideae, apice leviter corrugatae.—*Herba* bipedalis. *Folia* opposita, parvula, petiolata. *Flores* oppositi, pedicellati, in racemos paniculatim dispositi.

**T. longiflora**, *N. E. Brown*; species unica.

*Herba* perennis, bipedalis, ramosa, ubique puberula. *Folia* breviter petiolata, subcrassa, 0·5–2·5 cm. longa, 1·5–10 mm. lata, elliptico-lanceolata, obtusa, basi cuneata, integra vel paucidentata. *Racemi* 3–6 cm. longi, in paniculam terminalem 12–15 cm. longam dispositi. *Pedicelli* 3–4 mm. longi. *Calyx* 4 mm., demum 6 mm. longus. *Corolla* carnea; tubus 3·5–3·8 cm. longus, rectus, anguste cylindricus, fauce haud ampliata; labium superius 1 cm. longum, 7 mm. latum, cuneato-oblongum, apice emarginatum; labium inferius a basi tripartitum, segmentis lateralibus 6 mm. longis 1·5 mm. latis lineari-lanceolatis subobtusis, segmento medio 6–7 mm. longo explanato 3·5–4 mm. lato elliptico-oblongo obtuso. *Stamina* 7–9 mm. longa. *Stylus* aequaliter bifidus, lobis linearibus subobtusis. *Nucleae* subellipsoideae, apice leviter impresso-rugulosae.

South Africa. Transvaal: among rocks near Barberton, 1220 m., *Thorncroft*, 795.

In general appearance this plant much resembles *Syncolostemon densiflorus*, Benth., and when out of flower might possibly be mistaken for it, but the corolla, instead of having only 2 entire or slightly lobed lips, is distinctly 4-lobed, one lobe forming the upper lip and three lobes forming the lower lip, so that it cannot be generically associated with either *Syncolostemon* or *Orthosiphon*. The tube of the corolla is unusually long.

1386. **Leucadendron pseudospathulatum**, *Phillips et Hutchinson* in Dyer Fl. Cap. vol. v., sect. 1, p. 543, anglice [Proteaceae-Proteeae]; affinis *L. spathulato*, R. Br., foliis rectis obovato-oblanceolatis basi breviter angustatis trinerviis differt.

*Ramuli* leviter sulcati, glabri. *Folia* obovata vel oblanceolata, apice subacuta, basi angustata et trinervia, 2·5–4 cm. longa, 1–1·5 cm. lata, rigide coriacea, utrinque glabra, margine anguste cartilaginea. *Inflorescentia* ♂ depresso-globosa, circiter 2·5 cm. diametro, bracteis 2-seriatis involucrata; involucri bracteae coloratae, ovatae, subacuminatae, ad 1 cm. longae et 6 mm. latae, coriaceae, glabrae, margine ciliatae; bracteae floriferae oblongo-lanceolatae vel lineari-lanceolatae, subacutae, 1 cm. longae, ciliatae. *Perianthii* tubus 8 mm. longus, superne villosus; segmenta 6 mm. longa, glabra; limbus lineari-oblongus, 4 mm. longus, glaber. *Antherae* lineares, 3 mm. longae. *Stylus* 1·1 cm. longus; stigma 2 mm. longum. *Infructescentia* subglobosa, vix 2·5 cm. diametro; bracteae 5-seriatae, inferne fulvo-villosae, superne glabrae. *Fructus* transverse ellipsoidei, 4 mm. longi, 1 cm. lati, glabri.

South Africa. Cape Colony: Clanwilliam Div.; near Honig Valley and on Koude Berg, *Drège*, aa. Worcester Div.; Hex River Valley, *Wolley-Dod*, 4042.

1387. **Mimetes integra**, *Hutchinson* in Dyer Fl. Cap. vol. v. sect. i, p. 647, anglice [Proteaceae-Proteeae]; affinis *M. argenteae*, Knight, sed foliis argenteo-tomentosis, involucri bracteis exterioribus tenuiter pubescentibus, floribus pro rata minus exsertis.

*Rami* dense villosi. *Folia* lanceolata vel elliptico-lanceolata, apice integra, subacute callosa, basi leviter angustata, 5–5·5 cm. longa, circiter 2 cm. lata, dense adpresse argenteo-tomentosa; nervis lateralibus ascendentibus distinctis. *Inflorescentia* quam folia multo breviora, 4–4·5 cm. longa. *Capitula* versus apices ramulorum aggregata, 7–8-flora; involucri bracteae exteriores ovatae, obtusae, 6–8 mm. longae, 5 mm. latae, intermediae oblongae, apice rotundatae, circiter 1·2 cm. longae et 6 mm. latae, extra tenuiter adpresse pubescentes, intus glabrae, striatae, interiores (circiter 8) 1·2–1·4 cm. longae, lineares, extus dense villosae, intus glabrae. *Receptaculum* tenuiter setosum. *Perianthii* tubus brevissimus; segmenta 2·5 cm. longa, filiformia, tenuiter subadpresse pubescentia; limbus 7–8 mm. longus, linearis, acutus, extus breviter pubescens et tenuiter longe pilosus. *Antherae* 2·5 mm. longae. *Squamae* hypogynae subulato-filiformes, 2 mm. longae. *Ovarium* anguste ovoideum, 1 mm. longum, breviter pubescens; stylus 2·5 mm. longus, filiformis, glaber; stigma lineare, obtusum, 6 mm. longum. *M. Massoni*, Meisn. in DC. Prodr. vol. xiv. p. 264, partim, non R. Br.

South Africa. Caledon Div.; banks of the Zondereinde River, near Appels Kraal or neighbouring mountains, *Zeyher*, 3688.

1388. **Micrococca lancifolia**, *Prain* [Euphorbiaceae-Crotoneae]; species *M. capensi*, Prain, quam maxime affinis, differt foliis angustioribus secus nervos utrinque pubescentibus, ramulis crassioribus rhachibus petiolisque pubescentibus bracteisque majoribus.

*Frutex* dioicus erectus, ramulis crassiusculis dense pubescentibus. *Folia* petiolata, membranacea, lanceolata, acute acuminata, basi cuneata, margine crebre minute serrata, 10–12 cm. longa, 1·5–2·5 cm. lata, nervis utrinsecus 5–6 ascendentibus intra marginem anastomosantibus, subtus parum nervo mediano elevatis, juniora purpurascentia, utrinque secus nervos dense pubescentia ceterum glabra.

*Racemi* axillares ; masculi ignoti ; feminei 8–10 cm. longi, rhachis parce pubescens triente imo nudo excepto dissite florifera ; bracteae ovato-lanceolatae, bracteolaeque lanceolatae pubescentes ; pedicelli dense pubescentes, 4 mm. longi, bracteis duplo longiores. *Calyx* feminei 3-partitus ; lobi ovati, acuti, 3 mm. longi. *Squamae hypogynae* petaloideae, lanceolatae, 2 mm. longae. *Ovarium* 3-loculare, dense adpresse hirsutum ; styli 3, 2 mm. longi, basi connatae, fimbriato-laciniatae, reflexae. *Capsula* 3-cocca, 1 cm. lata ; cocci 2-valves, purpurascentes, parce hirsuti, crustacei, simul loculicide septicideque dehiscentes. *Semina* globosa, vix matura.

Madagascar. North Madagascar, *Baron*, 6310.

1389. **Asparagus zuluensis**, *N. E. Brown* [Liliaceae-Asparageae] ; affinis *A. retrofracto*, Linn., sed ramis rectioribus, foliis squamiformibus brunneis (nec albis), cladodiis brevioribus et antheris plus quam duplo brevioribus differt.

*Suffrutex* scandens, glaber. *Caules* vetustiores brunneo-cinerei ; rami et ramuli solitarii vel 2–8 verticillati, horizontaliter patuli, recti, graciles, ramis 8–16 cm. longis, ramulis 1·5–5 cm. longis. *Folia* squamiformia 3–4 mm. longa, ovata, acutissima, profunde concava, fusco-brunnea. *Cladodia* numerossissima, tenuissima, verticillata, incurvata, 1·2–1·4 cm. longa, 0·3 mm. crassa, filiformia, acuta. *Flores* in axillis cladodiorum solitarii. *Pedicelli* 6–7 mm. longi, infra medium articulati, parte persistente 2 mm. longa. *Perianthium* 2·5–3 mm. longum ; segmenta oblonga, obtusa. *Stamina* inclusa ; filamenta anguste linearia ; antherae perparvae, vix 0·5 mm. longae et latae, suborbiculares. *Ovarium* breviter stipitatum, trigono-globoso-obovatum, subgranulato-rugosum ; stylus 0·75 mm. longus, apice trifidus, inferne leviter incrassatus.

South Africa. Zululand, from a plant collected by Mr. J. Wylie and cultivated in Durban Botanic Garden, Natal, *Wood*, 11969.

1390. **Stylochiton Rogersii**, *N. E. Brown* [Aroideae-Stylochitoneae] ; affinis *S. lobato*, N. E. Brown, sed foliis angustioribus, spathae tubo multo longiore et spadice incluso differt.

*Herba* perennis, tuberosa. *Folia* 4–5, radicalia, glabra ; petioli 7–10 cm. longi, ad medium vaginati, variegati ; laminae anguste sagittato-hastatae ; lobum anticum 10–15 cm. longum, 1·1–1·8 cm. latum, lineare, acutum ; lobi postici 2·5–4·5 cm. longi, 4–8 mm. lati, lineares, obtusi. *Spathae* 1–2, axillares, petiolos subaequantes, pedunculatae; tubus 5·5 cm. longus, 1·3 cm. latus ; limbus obliquus, acutus, 2·5 cm. longus, extra viridis, intra albidus ? *Spadix* inclusus, 5·3 cm. longus. *Flores feminei* 7, monocyclicae, liberae ; perianthium totum adnatum, obliquum. *Flores masculi* dense conferti ; perianthium compressum, 4-dentatum ; stamina libera ; filamenta brevissime clavata, crassa.

Portuguese East Africa. Near Villa Machado, *Rogers*, 4500.

# XXXIII.—SOME GARDENS AND PARKS IN S. EUROPE.

W. J. Bean.

Four years ago at the desire of the Director I visited a number of gardens and parks in Central Europe, and some notes on that journey appeared in the *Kew Bulletin* for 1908, p. 387. During April of the present year I was directed to make a journey with similar objects in Italy and Dalmatia. On this the following notes are based :—

## La Mortola.

As an only slightly lengthened journey was involved it appeared desirable to reach Italy by way of the French Riviera, and thus I was enabled to devote four days to visiting the famous gardens at Hyères, Villa Thuret and Eilen Roc (at Antibes), Monte Carlo and La Mortola. A fortnight or three weeks might very profitably be spent on the seaboard between Marseilles and Genoa, but if there were only time to visit a single garden that garden should be La Mortola. There are of course finer individual specimens of certain plants to be found in other gardens, but nowhere is there such wealth and variety and such general excellence as at La Mortola. Founded by the late Sir Thomas Hanbury, and still maintained in all its efficiency by Lady and Mr. Cecil Hanbury, it is to all intents and purposes a first-rate botanic garden, combining with its scientific value admirable object lessons in cultivation and landscape art.

La Mortola has so frequently been described in the public press that it is unnecessary to attempt the task again. Notes in connection with it have appeared in previous numbers of the *Bulletin* (*see* 1889, p. 287 ; and 1892, p. 1). The gardens stand picturesquely on a steep slope washed at its base by the Mediterranean. Many years of assiduous collecting, combined with excellent cultivation, have established on this spot a rich collection of plants from sub-tropical and warm temperate regions. Probably no open air collection on the continent surpasses this in number of species, certainly nowhere else are these plants to be seen in more characteristic form and beauty. It would be too long a task to do more than speak in general terms of the collection. To one whose experience has been confined to northern gardens almost every step at La Mortola reveals some striking or unfamiliar plant, perhaps one he has hitherto only known as a weakling in a pot growing in all its natural luxuriance, many altogether new and unfamiliar to him.

Mention of a few of the plants in flower on April 4th will give some idea of the diversity of the collection here : *Aloe Hanburyana* with crowds of brilliant red spikes, *A. plicatilis*, coral red, *A. Marlothii*, rich crimson and orange, *A. rubro-violacea* ; *Dimorphotheca aurantiaca*, *Echium fastuosum*, *Gnidia carinata* (yellow), *Grevillea vestita* (white), *G. Thelemanniana* (scarlet) ; *Mesembryanthemum edule*, *M. atroviolaceum* (with lustrous purplish-violet flowers), *Sutherlandia frutescens*, *Calodendron capense*, *Fuchsia arborescens*, *Leptosyne gigantea* (yellow, and very showy on walls), *Berckheya grandiflora* (a shrubby composite, with bright yellow heads 3 to 4 inches across), *Wigandia caracasana* (known in England as a plant for sub-tropical bedding, here a small tree carrying noble panicles of purple

flowers), *Tecoma australis* (pale yellow), *Jasminum primulinum*, *Pilocarpus pennatifolius* (with slender racemes of lurid purple flowers, *see* Bot. Mag. t. 7235), *Odontospermum sericeum* (yellow flowers and silky grey foliage), *Iochroma lanceolata*, *Pittosporum phillyraeoides* (with elegant pendulous branchlets clothed with blossom); *Sophora secundiflora* (a bushy evergreen 10 ft. high with Wistaria-like thyrses of dark blue and white flowers, strikingly handsome), *Eucalyptus crebra* (with rugged cork-like bark), *Leptospermum laevigatum*; *Cytisus filipes* 10 ft. high, a cascade of milk-white flowers.

Succulent plants thrive remarkably well and there is a very extensive collection of them. Among Agaves, the vividly glaucous *A. Franzosini* is perhaps most conspicuous, and among Opuntias none so pleasing as *O. tunicata*, very abundant here on walls and other places and always conspicuous in the slender spines 2 inches long covered with a white membranous sheath. Of ordinary flowering things like roses it is no necessary to write, but they made a beautiful display, and here I first saw the glorious masses of the various Banksian roses in bloom which give to Italian gardens at this season their greatest charm.

## Hyères.

The Acclimatisation Garden at Hyères is a branch of the establishment at Paris. The most imposing trees in the garden are *Eucalyptus globulus* which, both here and at Villa Thuret, overshadow all native trees. It was here I first saw in quantity *Pittosporum Tobira*, a Japanese species. It is the most conspicuous evergreen in this garden and bore large crops of deliciously scented flowers, open and in bud. In the gardens of Italy and even Dalmatia this Pittosporum is planted in great numbers, being only less abundant than *Euonymus japonicus* and much more pleasing. It is always effective either as a picturesque isolated bush (I saw them 25 ft. high on the Isle of Lacroma), in masses, or as a hedge. It promises to fill the same place in these countries as *Rhododendron ponticum* or Cherry laurel does at home, and is perhaps in danger of being equally overplanted. At Hyères, *Melaleuca thymifolia* is 25 ft. high, its slender pendulous branches extremely elegant, *Cereus monstrosa* is 10 ft. high, and deserving of mention are two fine pyramidal examples of *Juniperus drupacea* (male and female), and a group of five magnificent *Washingtonia robusta*, perhaps 50 ft. high.

Hyères is noted for the abundance of palms, mostly *Phoenix canariensis*, in its streets. They meet the eye at every turn and many of them are now of great size, with rugged picturesque trunks. I believe the town is proud of them. A rainy morning, such as the one when I was there, is certainly not the best time to appreciate avenues of *Phoenix*, but it appeared to me that the sullen grey tints of these innumerable palms give a sombre, almost funereal, aspect to the town.

## Villa Thuret, Cap d'Antibes.

On a hill outside the little town of Antibes is the famous garden of Villa Thuret, containing an extensive collection of exotic trees and shrubs founded chiefly by the late Charles Naudin. It is a

picturesque garden of quite informal design richly stocked (too richly, indeed, to secure the best landscape effects) with plants from Australia, New Zealand, Chile, Japan and S. Europe. The conifers are very good, and it was interesting to see well-grown trees of such species as *Tetraclinis articulata* (40 ft.), *Podocarpus macrophyllus*, an elegant slender tree 45 ft. high, *Cupressus lusitanica* (perhaps 80 ft.) and *Taxodium distichum* with pendulous branchlets. *Araucaria excelsa* grows to a good size on this coast but seems to be thinly furnished and damaged by wind. I saw no tree anything like so well furnished and graceful as the one in the Temperate House at Kew. *A. Bidwillii*, on the other hand, 40 ft. high, is in perfect condition. *Cycas revoluta* is common in the open air in S. France and Italy, but other cycads are rarely seen. Here at Villa Thuret were *Encephalartos Lehmannii* and *E. longifolius*. Among palms other than common *Phoenix*, *Trachycarpus*, etc., the most striking are fine examples of *Erythraea armata* (or *Brahea Roezlii* as it is usually named here), its curving fronds being of an intense glaucous hue. Eucalypti of various sorts thrive exceedingly, some with trunks perfectly smooth others with the bark hanging loose in large strips or flakes. Here, as at Hyères, it is the Eucalypti that stand up above all other trees and first catch the eye as one approaches the garden.

In flower I noticed *Pittosporum undulatum* (25 ft. high), *Polygala myrtifolia*, *Catha edulis*, the curious "Arabian tea," which flowers only on shoots with opposite leaves, the barren shoots having alternate ones; *Guichenotia ledifolia*, *Leptospermum laevigatum*, 25 ft. high, with shredding bark, *Westringia rosmarinifolia*, *Wigandia caracasana*. Here I first met with *Spiraea cantoniensis* in flower, both single and double—a Chinese shrub that has spread all through Italy and Dalmatia both in public and private gardens, its long arching sprays of pure white flowers making it there the most graceful and beautiful of all deciduous shrubs in flower in April. It is scarcely hardy at Kew.

There is much of interest horticulturally on the Cap d'Antibes; a great trade is done in early roses for cut flower, and one grower makes a speciality of Gerberas, his stock, I believe, having originated from the varieties raised by Mr Irwin Lynch at the Cambridge Botanic Garden. No one should miss the wonderful gardens of Eilen Roc which are open on Tuesdays on payment of one franc. They stand upon, and partially cover, rocky cliffs washed at the base by the Mediterranean, and through and about them walks lead one to most enchanting views of coast, mountain and sea. The gardens themselves, owned by Mr. Wylie, are perfectly kept and well stocked with choice plants. The entrance fees, now amounting to several hundreds of pounds per annum, are devoted to charitable purposes. A similar arrangement obtains at La Mortola.

## Milan.

Visitors to Milan who are interested in park planting should pay a visit to the Giardino Pubblici. It is not often one sees a public park so admirably planted. The ground is undulating but not hilly, and the well-planned walks lead the pedestrian to a succession of

beautiful vistas and tree groups. I do not know the date of the foundation of the park; many of the trees must be 100 or more years old, but may have existed on the site previously. The designer appreciated the higher landscape value in gardens of grouped trees and shrubs as compared with a mixture of individuals, and the provision of spacious lawns helps to the appreciation of their beauties. The Judas-tree was really splendid here. A group of about twenty *Taxodium distichum* approaching 100 ft. in height planted near the lake have developed conspicuous "knees." A group of magnificent fastigiate oaks made a bold and striking picture, and *Magnolia grandiflora* planted in a mass was 50 ft. high. A great hollow rectangle of horse chestnuts in flower made an effective display. Cedars and especially the deodar are exceptionally vigorous, but some other conifers like common spruce are poor and should be removed. *Aegle sepiaria* has occasionally been suggested as a hedge plant in England. There is one in this park about 100 yds. long, not so efficient a barrier as I should have imagined. Probably the persistent clipping prevents the full development of formidable spines, and its restriction to 3 or 4 ft. in height may curb its energies too much. A group of *Musa Basjoo* (or *japonica*) here, as in other places, looked very forlorn with stems bare or carrying but one or two battered leaves, leading one to wonder (as with some bamboos at home) whether their beauty at one part of the year sufficiently compensates for their depressing appearance during the remainder.

The people of Milan have reason to be proud of their park, but they ought to treat it with more respect. Restaurants and wine shops may perhaps be regarded as necessary evils, but some malodorous aviaries made of wire netting should be removed, and automatic weighing machines could be dispensed with. Nor should a public park be sprinkled over with effigies of departed worthies who, however eminent or patriotic, seem rarely to have been prepossessing.

Between the Castello and the Arco della Pace is the extensive "Nuova Parco," planted with intelligence on the lines of the older gardens, but too new to be interesting and too much given up to motors and other wheeled traffic ever to possess the charm of the smaller and older garden—from which such traffic is excluded.

## Pallanza.

There is much that is interesting to be seen by the lover of gardens and especially of trees and shrubs in and about Pallanza. There is the well-known nursery of the Brothers Rovelli and many well kept gardens belonging to private houses and hotels, and, within an hour's row on Lake Maggiore, are the famous gardens of Isola Bella and Isola Madre. The vegetation generally is luxuriant and presents rich and varied tints that give a pleasant change from the grey olive-clad country farther south.

Messrs. Rovelli's nursery occupies an elevated promontory jutting out into Lake Maggiore, charming views of which on both sides are obtained from the summit. On the other hand, to the view of travellers along the road which follows the margin of the lake, the nursery presents a remarkable variety and wealth of vegetation.

The grounds are of especial interest for the large specimens of trees they contain that are scarcely hardy in the British Isles or only in the south-west. Of Mexican pines, there are *Pinus pseudo-patula* with picturesquely rugged bark, *P. Wincesteriana* and *P. Russelliana* (forms of the very variable *P. Montezumae*), *P. Llaveana* and *P. patula* (the last 35 ft. high, a striking mass of drooping foliage of a pale glaucous hue) all trees of unusual size in Europe. *P. canariensis* is 35 ft. high but apparently suffers from cold. The most interesting conifer in the nursery is a superb example of *Keteleeria* (*Abies*) *Fortunei*, quite unrivalled in Europe. It is about 85 ft. high and its erect shapely trunk is about 2 ft. 9 in. in diameter, furnished to the base with branches. The ground about was strewn with old cones. Not far from it is a grand specimen of golden larch (*Pseudolarix Fortunei*) between 90 and 100 ft. high and 9 ft. in girth near the base. This tree is, of course, quite hardy in England; what makes the Pallanza tree so interesting besides its noble dimensions is its fertility. Mr. W. B. Hemsley, in writing of this species in the Botanical Magazine, t. 8176, observes that the only perfect seeds he had been able to find were some that Fortune collected 50 years before, now preserved in spirit at Kew. But beneath the branches of Messrs. Rovelli's tree are hundreds of young seedling trees that have sprouted from its fallen seeds. They vary from 1 to 6 years old and from a few inches to 2 or 3 ft. in height.

The New Zealand *Podocarpus Totara* is 30 ft. high; *P. chilina* 25 ft. A female *Araucaria brasiliensis* is 60 to 70 ft. high with a slender trunk 15 inches in diameter. There are also a good *Abies religiosa*, a Mexican fir only grown in a few places in the mildest parts of the British Isles, a splendid *A. bracteata*—so rarely seen in fine condition, and *Cunninghamia sinensis*, of which the same has to be said. *Pinus australis*, the true pitch pine, is 50 ft. high.

Other plants besides conifers that were noted are too numerous to mention, but a few deserve special notice:—*Aegle sepiaria* is 12 ft. high and as much through and bears fruit freely; its ally, the little *Citrus japonica*, was covered with its brightly coloured yellow fruits about the size of large marbles. *Eugenia apiculata* is 30 ft. high; *Illicium religiosum* prettily in flower; *Camellia Sasanqua alba* 18 ft. high and only a little less wide, a dense bush; the variety *rosea* nearly as large; *Olea fragrans* 25 ft. high and over 30 ft. through; and there are large bushes of the tea plant. *Rhododendron Sesterianum*, one of the hybrids between *R. ciliatum* and *R. Edgeworthii*, 6 ft. high and laden with blossom, made an exquisite picture.

## Isola Bella and Isola Madre.

In order to visit these two islands conveniently it is best to take a rowing boat from Pallanza or Baveno; the regular steamers that ply on Lake Maggiore call at Isola Bella but not at Isola Madre, which for its vegetation is decidedly the more interesting.

Isola Bella is the most noted of the group of Borromean Islands and is one of the beauty spots of N. Italy. Originally a rocky islet, it was converted into its present fertile state about 1671 by

the then chief of the ancient and famous family of Borromeo, who had soil conveyed to the island and the foundation of the present gardens laid. On the west side they occupy ten terraces rising one above the other. The trees and shrubs of Isola Bella exhibit a remarkable luxuriance of growth. There is a common camphor tree, for instance, with a bole over 3 ft. in diameter; *Quillaja saponaria* is 43 ft. high; *Pieris nitida* 20 ft. high; bushes of *Azalea indica* 20 ft. through, both purple and white varieties. Among more uncommon things, *Rosa Watsoni*, a species with thin narrow leaflets and rarely seen in good condition with us, is 6 ft. high; the noble round-leaved *Dombeya* (*Astrapaea*) *Wallichii* 9 ft. high; *Cryptocarya Peumus* 25 ft.; *Magnolia fuscata* 15 ft. high; *Eucalyptus amygdalina* with a trunk 2 ft. 3 in. in diameter, smooth and grey. The growth of bamboos here equals that of the French and Italian Riviera; *Phyllostachys mitis* is over 30 ft. high, and the not frequently seen *Bambusa quadrangularis* 12 ft.

A few minutes' rowing brings one to the rocky Isola Madre. Here is an extensive collection of trees and shrubs growing in the open air, especially of Australian and Chilean ones. Among the first things that strike one in ascending from the little landing place is a *Jubaea spectabilis* with a trunk as thick as the one in the Temperate House at Kew and clear of leaves for 25 ft. up. After having traversed the Riviera, *Magnolia grandiflora* has become so familiar that one almost ceases to remark it, but here at Isola Madre it is so fine that one's admiration is perforce renewed. A mass of *Beschorneria yuccoides* with its tall arching panicles of scarlet flowers gave a charming combination of grace and bright colour. An *Elaeagnus*—always called *E. reflexus* in the S. of Europe—which from the shining brown undersurface of the leaves must be a form of *E. glabra* or perhaps a hybrid between it and *E. pungens*, is occasionally seen in English gardens as a low spreading evergreen shrub. In S. France and Italy it becomes a climber; at La Mortola it had reached the top of a pine 40 ft. high; in some places it is used as a thick, clipped hedge trained on iron fencing. Here at Isola Madre it serves admirably for forming arbors. It appears to have some value as a sea-side plant. At the Chateau of Miramar near Trieste I saw masses of it luxuriating on cliffs within a few yards of the Adriatic.

**Cupressus cashmeriana.**—The most interesting and remarkable tree on Isola Madre is the Cashmere cypress. The history of this species is somewhat obscure and its native country—most probably N.W. India—is not certainly known. It may even be a form of *C. torulosa*. It has a scattered distribution as a cultivated tree in N. India and few plants of it exist in Europe; the best in the United Kingdom is in the Himalayan House at Kew. By far the finest tree in Europe is this one on Isola Madre, now about 65 ft. high and over 6 feet in girth of trunk. Its foliage is of a vivid silvery grey and its branchlets, being long and slender, hang gracefully all round the tree. The only other tree of any size that I saw was a smaller one in the garden of the Casa Mestorff on the shores of Lake Maggiore at Pallanza.

**Banksian Roses.**—The most fascinating of all plants in this part of the world in April and May is the Banksian rose. Altogether

there seem to be five forms of it: single white (in two forms, large and small), single yellow, double white and double yellow. Of these the double yellow would appear to be the most popular. One sees it grown in various ways, such as on and over walls, on arches, on pergolas, and on trees, but its beauty never palls, for associated with the colour beauty of its blossoms are the rich verdancy of its leaves and the unsurpassed grace of its long slender branches. At Isola Madre it has reached the top of a common bay tree and now drapes it almost to the base, at the time I saw it a slender pyramid of glorious yellow 40 ft. high.

The Deodar succeeds admirably wherever I saw it in Italy, and at Isola Madre it was magnificent. Of other trees hardy in Britain I noted *Libocedrus decurrens* with a trunk over 3 ft. through and, as I noticed elsewhere, not columnar in shape as it usually is with us, but pyramidal and more spreading, *Taxodium distichum*, *Liquidambar styraciflua* 70 ft. high, *Aegle sepiaria* a tree 15 ft. high, *Abies Pinsapo* and Lawson cypress. On the other hand the difference between this and the average climate of Great Britain is shown by the existence of such plants luxuriating out-of-doors as the following: *Acacia dealbata* *A. Baileyana*, *A. melanoxylon*, *A. longifolia*, *A. pravissima*, *Hakea saligna* (in bloom), *Podocarpus Totara*, *Rhododendron arboreum* 30 ft. high with a trunk 18 inches in diameter, *Fatsia papyrifera*, *Casuarina equisitifolia*, Agaves, Dasylirions and Opuntias. *Erica arborea* here fully justifies its specific name.

## Florence.

At Florence I had the good fortune to have the guidance of Professor Beccari, once Director of the Botanic Garden at Florence. At Kew Prof. Beccari is held in particular esteem as the donor of two of the most remarkable plants ever introduced to Europe, viz., *Amorphophallus Titanum*, which first flowered at Kew in 1889 (*see* Bot. Mag. tt. 7152–4–5), and *Bulbophyllum Beccari*, which flowered in the Orchid Houses at Kew in 1881 (*see* Bot. Mag. t. 6567). In his own garden in the suburbs of Florence Prof. Beccari cultivates an interesting selection of palms in the open air, two of which by his kindness we were enabled to illustrate. The more remarkable one, *Nannorhops Ritchieana*, Wendland,* a very rare palm from N.W. India, is the finest in Europe. It is 25 years old and forms a large cluster of leaves rising directly from the ground (having as yet no visible stem) and measures 10 ft. in height, 15 ft. in diameter, the stiff, sturdily-stalked leaves with blades 5 ft. long. This palm ought to be hardy in the mild south-west counties of Britain. The

* **Nannorhops Ritchieana,** *H. Wendland* in Bot. Zeitung 1879, p. 148; Aitchison in Journ. Linn. Soc. xix., 140, t. 26. A gregarious tufted low-growing glabrous palm, with prostrate branching robust rhizomes or stems. Leaves cuneately flabellate, rigid, plicate, split into curved 2-fid segments; petiole short. Spadix interfoliar much branched; spathes tubular sheathing, spathels ochreate; flowers polygamous. Calyx tubular, membranous, unequally 3-lobed. Corolla 3-partite, segments valvate. Stamens in hermaphrodite flowers 6, in male about 9. Ovary trigonous; style short, stigma 3-toothed; ovules basilar. Drupe small, globose or oblong, 1-seeded, style basilar. Seed free, erect, ventrally hollowed; hilum small, albumen equable; embryo dorsal or sub-basilar. Beccari and Hook. f. in Flora of British India, Vol. vi., p. 429.

A native of Sindh, the Western Punjab, Afghanistan.

NANNORHOPS RITCHIEANA.

[*To face page* 290.

TRACHYCARPUS TAKIL

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other palm of which an illustration is given is *Trachycarpus Takil*, Beccari,* also from N. India. It is a close ally of the hardy *T. excelsa*, but easily recognisable by its different port and by the closer, neater fibring of the trunk.

A visit was made to the School of Horticulture at Cascine on the outskirts of Florence. An interesting branch of activity here is the hybridisation and improvement of Anthuriums, especially of the red-spathed section. A group showing some of the best results secured a first prize at the recent International Show at Chelsea. Another interesting culture is that of Camellias in the decomposed wood of *Castanea sativa*. This material, regarded here as a substitute for peat, is the brown, fungus-killed wood one sees in hollow trees, and Camellias, which will not grow in the ordinary soil, thrive well in it. *Acacia dealbata* also fails in the ordinary soil and is grafted on *A. longifolia* which succeeds in it. An extensive pinetum is maintained containing many admirable specimens, among them Monterey Cypress (*C. macrocarpa*), girthing 11 ft. 4 in., and a large specimen of the fastigiate *Cephalotaxus pedunculata*, the lower part of which had reverted to the ordinary spreading type. As street trees in this part of Florence I noted *Celtis australis* with its clean trunk like a beech, and *Melia Azedarach*, still retaining much fruit.

## Boboli Gardens, Florence.

These gardens are deserving of a visit because they represent the typical gardens of Italy. They are attached to the Royal Palace of Tuscany, but since the unification of Italy under the House of Savoy, neither the Palace nor the Gardens have been much used by the Royal Family; they are open to the public on certain days. Situated on the slope of a hill they give from the summit many striking views of Florence and the surrounding country, the most distinctive feature of which are the grey olive-clad hills out of which stand the dark spires of Cypress. The gardens themselves show many features of peculiar interest, added to which is the charm which age and associations alone can give. We are accustomed to regard Versailles as the first, as well as the grandest, exposition of its peculiar type. But that the ideas which gave it birth existed a century previously is shown by these Boboli Gardens at Florence,

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* **Trachycarpus Takil**, *Beccari.*—Caudice robusto elato e basi obliqua cito ascendente erecto, foliorum vaginis reticulo arcte induto, filamentis liberis pannosis fere destituto; vaginarum appendicibus liguleformibus triangularibus brevibus in gemma terminali erectis; frondibus omnibus persistentibus, inferioribus marcescentibus, limbo ¾ orbiculari in laciniis numerosis (45–50) ensiformibus breviter bifidis vel bidentatis profunde et irregulariter partito; spathis tenuiter membranaceis superioribus inflato-ventricosis; floribus masculis globoso-trigonis, calyce parvo; corolla quam calyce subtriplo longioro; staminibus quam corolla conspicue longioribus; floribus foemineis glomerulato-2–4-nis, pedicello brevissimo suffultis; ramulis floriferis inconspicue papilloso-puberulis vel glabrescentibus; fructibus transverse reniformibus profunde umbilicatis, stigmate prope apicem excentrice et fere laterali, endocarpio tenui. Beccari in Webbia, i., p. 52.

This palm, allied to *T. excelsa* and *T. Martiana*, is found in N.E. Kumaon, where, according to Duthie (Gardeners' Chronicle, 1886, i., p. 457), the natives call it "Thákil," from which "the mountain called the Thákil to the south of Phithauragarh is named." Duthie, however, regarded it as *T. Martiana*.

founded as they were in the middle of the 16th century. There is the same predilection for straight lines, tall clipped hedges, broad gravel walks and statuary. But there is one thing that gives the Italian Gardens a very distinctive character, which is the prevalence of the spire-like, fastigiate form of *Cupressus sempervirens*. Here there is a splendid avenue of them over 300 years old, some of the trunks being over 6 ft. in girth. The Holm oak is much used to form hedges and in its natural shape; in one place it is made to form the low arches of a long pleached alley. At the lower side of the garden there is a pleasing old-time arrangement of formal box-edged beds and statuary surrounded by water.

## Naples.

The most important public place for tree study in Naples is the Villa Nationale, a park and promenade stretching along near the sea at the west end of the town for two-thirds of a mile. It was originally laid out in 1780, and there are in places some finely grown trees. This was the most southerly point I reached, and the latitude was indicated by the character of the trees and shrubs grown, which were of a more subtropical character than I had seen either at Florence or Rome. Among palms, *Sabal Blackburniana* was in robust health; a group of 14 examples of *Washingtonia robusta* with their uniform circular stems suggest the columns of a Greek temple; besides the common *Phoenix canariensis* there is a fine specimen of the date palm 50 ft. high. *Strelitzia augusta* was in flower; *Grevillea robusta* was 50 ft. and *Casuarina equisetifolia* 20 to 30 ft. carried enormous crops of persistent cone-like fruits, 1½ to 2½ inches long. An *Erythrina*, probably *E. Caffra*, 30 ft. high, had a trunk 2 ft. in diameter. *Agave potatorum* was in flower, as was also *Acacia longifolia* 30 ft. high. The branches of *Cercis Siliquastrum* were simply cylindrical masses of blossom. The value of Holm oak as a sea-side shelter tree (apparent enough in some of our south coast resorts) was very evident here. Of three rows of trees, those on the outside are within 20 yards of the sea, much battered and tilted over from windward; the middle row shows the same influences to a less degree, whilst those of the third row are practically normal in growth and shape. With so many interesting trees available for the purpose, the use of common *Robinia Pseudacacia* as an avenue tree in this climate can scarcely be regarded as an inspiration, the trees (in full flower on April 12th) have a thin meagre aspect. Among the plants used for bedding are Cinerarias and *Clivia miniata*.

## La Floridiana, Naples.

Through the kindness of Sir Schomberg K. McDonnell I obtained an introduction to the garden at La Floridiana. The villa was built by one of the Bourbon Kings of Naples—a white house situated in the Vomero district and conspicuous from Lower Naples in its setting of dark green vegetation. It is now owned by Mrs. Harrison whose keen interest in her garden makes it probably the most beautiful and admirably managed in Naples. From its elevated site glorious views are to be had of the sea with the islands of Capri and Ischia in the distance, of Vesuvius, and the coast line of the

bay to Sorrento. In this garden I had the good fortune to see the finest examples of stone pine (*Pinus Pinea*) I had found. This tree is, of course, one of the characteristic trees of Italy made familiar to us in innumerable drawings and paintings, but rarely, so far as I could judge, is it so fine as here, where several of its towering columnar trunks, crowned with a dark spreading mass of branches and foliage, show to perfection against the sky. A notable tree growing near the house is a Carob (*Ceratonia Siliqua*) with a trunk 3 to 4 ft. in thickness. Of rarer trees is a very good example of *Pinus leiophylla*, one of the *Montezumae* group of pines, with five leaves in a bundle, native of Mexico ; its thick, pendulous masses of pale grey, almost thread-like foliage, are very striking. There is also an admirable tree of *Araucaria Bidwillii*. Many of the plants noted elsewhere are, of course, growing here also, such as *Pittosporum Tobira*, *Chamaerops humilis*, fine masses of Camellia and *Juniperus drupacea*, always in great perfection. A hedge of blood-red *Rosa indica* I was too early to see, but in a few weeks later it must make a wonderful display. The grounds cover some 20 acres but are so admirably disposed that they seem much larger. There is no formality, and the grounds are traversed by winding walks, canopied in many places by the branches of Holm oak, Aleppo pine and other trees. In many places an exquisite green carpet of thick moss covers these shaded walks—as good to walk upon as the richest Persian carpet.

## Bologna and Padua.

Both these cities possess small botanic gardens of ancient foundation ; that of Padua is said to be the oldest in Europe, dating back to 1545. At Bologna the most remarkable tree in the garden is *Liquidambar orientalis*, which we only know in England by a few specimens under 20 ft. high. The tree at Bologna is probably 90 to 100 ft. high, and its trunk at the base is over 5 ft. in diameter, slightly buttressed. It dominates the garden. There are also admirable examples of *Taxodium distichum*, *Celtis occidentalis* 60 to 70 ft. high, *Gymnocladus canadensis* 50 ft., *Elaeagnus orientalis* 40 ft., *Koelreuteria paniculata* nearly as high, *Paulownia imperialis* 50 ft., *Pistacia Terebinthus* 30 ft., and *Vitex Agnus-castus* a rugged, picturesque, small tree 12 ft. in height and width. The fine development of all these trees indicates that they exist under a more eager sun than ours. Yet we have our compensations. *Aucuba japonica*, for instance, leads an unhappy career in a pot under glass, and the numerous ericaceous and other evergreens that give warmth to our gardens in winter are not to be seen.

A still larger selection of fine trees is to be seen at Padua, indeed I know of no spot so small in extent that contains such a variety of finely developed individuals. The greatest diameter of the garden does not exceed 250 yards, in places it is about 100 yards across, and a considerable part is given up to arrangements of herbaceous plants and to glass houses. Many of the trees, according to their labels, were planted in 1760, but one Oriental plane dates from 1680. Its trunk is 29 ft. round at the base, but through internal decay is now a shell merely. Among American trees *Liriodendron Tulipifera* is 90 ft. high ; black walnut has a trunk

4 ft. in diameter ; *Fraxinus juglandifolia* and *F. epiptera*, both forms of American white ash, 90 to 100 ft. high, the former 12 ft. in girth ; *Carya olivaeformis* is a really splendid example 100 ft. high, its handsome, finely buttressed trunk 3 ft. in diameter. A tree labelled *Diospyros Lotus* 90 ft. high looked extremely like *D. virginiana*, its trunk 2 ft. in diameter covered with rugged chequered bark exactly like that of the famous tree of the latter species near the Sun Temple at Kew. Several specimens of *Lagerstroemia indica* are 20 to 30 ft. high, well marked by their clean smooth trunks. This tree must be one of the great features in Italian gardens when in bloom later in the season. *Magnolia conspicua* is 40 ft. high ; *Cephalotaxus pedunculata* 30 ft. ; and *Hibiscus syriacus* only a few feet less in height. These are but a few of the more noteworthy trees (there are for instance admirable examples of *Ginkgo* and deciduous cypress) but they serve to show that this charming old garden at Padua is well worth inspection. I think it is a mistake in the management to allow so many trunks to be covered with ivy. It is not that it does harm, that I believe only happens when the ivy reaches the leafy part of the tree, but where so unusual a number of trunks of exotic trees are to be seen in characteristic beauty as at Padua, it is a pity to let them be hidden by ivy.

The herbaceous garden is circular and surrounded by an ancient wall entered by two fine gateways. The plants themselves are arranged in a series of square compartments usually about 3 ft. across formed by stone edging, one plant or clump in each plot. In April the stone was much more in evidence than the plants.

## Abbazia (Istria).

This little town is situated on the E. coast of Istria at the N. end of the bay of Quarnero and may be reached in 45 minutes by steamer from Fiume. It is now a fashionable health resort especially for the Viennese, and in the Angiolina Park a well-kept garden is maintained. This park is situated close to the shores of the Adriatic and appears to have been originally completely covered with wild bay-laurel (*Laurus nobilis*). The ground is hilly and rocky, and in the wilder parts much of the apparently primaeval bay-laurel still remains, often in dense thickets 50 ft. high. Winding through these thickets and amongst enormous boulders pleasant shady walks have been made. The mean winter temperature is 50° Fahr. and many plants, tender with us, are thriving here. Thus, *Trachelospermum jasminoides* makes a mass on a lawn 10 ft. through and 5 ft. high : an extensive group of *Beschorneria* was sending up numerous spikes of red flowers ; trees of camphor are 50 ft. high, and various Agaves, Opuntias and Dasylirions are succeeding. The vegetation as a whole is very luxuriant, and as money is evidently plentiful there is no reason why this place with its beautiful situation and equable climate should not in time rival the Mediterranean resorts. The management appears to be alive to the desirability of increasing the attractiveness of the gardens for numerous small plants of new subtropical species had apparently been recently obtained. *Ophiopogon japonicum* is used more or less

in nearly all the gardens I visited for forming edgings and as a low green covering for the ground, here perhaps more extensively than elsewhere. Where grass will not grow it makes probably as good a substitute as anything obtainable, in appearance, at any rate, suggesting a coarse herbage.

## The Dalmatian Coast.

Starting from Trieste on one of the various steamers by which one may go as far south as Cattaro, rounding the peninsula of Istria and touching at various coast towns and islands on the Adriatic, I had an opportunity of seeing the gardens at Trieste, Spalato, Ragusa, Cattaro, Abbazia and Fiume, and occasionally of seeing the native vegetation as well.

On the whole the ornamental gardening of this part of Austria-Hungary cannot be compared with that of the French and Italian Riviera or that of Lake Maggiore, in the use of exotic trees and shrubs. There is, however, enough to show that, given the will and the means, the best gardens of the Mediterranean region might be rivalled. It is, of course, chiefly a matter of money and skill. At present comparatively few English people visit it, but efforts are, I believe, to be made by the steamship companies and others to bring the beauties of this coast into greater prominence. In association with these efforts it would pay the local authorities of the more important towns to engage men trained in the Riviera to superintend the public gardens and to introduce the plants which add so much to natural attractions, even on the N. Mediterranean littoral.

As showing the nature of the climate at Ragusa, for instance, there may be mentioned a group of *Washingtonia robusta* 40 to 50 ft. high, fine Oleanders, *Pittosporum Tobira*, *Eucalyptus globulus*, the variegated *Yucca aloifolia*, Opuntias, *Cycas revoluta*, and the Loquat fruiting freely. An interesting feature of the streets are old trees of white mulberry with rugged trunks 2 ft. 6 in. in diameter. On the cliffs about the town *Agave americana* appears to be naturalised: its tall flower-stems, in various stages of development or decay, standing out against the sky, form one of the most lasting mental pictures the visitor carries away from Ragusa.

On the hills behind the town the landscape was enlivened with the flowers of a shrubby broom-like plant—*Calycotome infesta*, a close ally of Cytisus and Genista, bearing its yellow, pea-shaped blossoms in great profusion. This shrub (too tender for our gardens) is, as its specific name suggests, regarded as a pest more than anything else in Dalmatia, its long, stiff, sharp spines impeding in many places the progress of man and beast.

At Gravosa (the port of Ragusa) one saw the Oriental plane in something like its native splendour. Not far from the quay is an immense tree with a trunk 6 ft. in diameter near the base, and clear of branches for 20 ft. up.

Close to Ragusa and within half an hour's row is the Isle of Lacroma, worth visiting for the sake of the rich native vegetation that covers it and for the old gardens attached to the monastery of San Marco—a 12th century foundation. The native plants make a dense thicket all over the island, scarcely penetrable in many places.

Most in evidence were Myrtle, *Pistacia Lentiscus*, *Erica arborea*, *Viburnum Tinus*, *Juniperus drupacea*, *Phillyrea media*, *Andrachne Unedo*, Cistuses, *Lonicera Etrusca* forming tangled masses, *Spartium junceum*, etc. Taller trees were chiefly *Quercus Ilex*, *Cupressus sempervirens*, *Laurus nobilis*, and the Aleppo Pine (*Pinus halepensis*).

The gardens round the monastery (once fitted up as a chateau and occupied by the late Crown Prince of Austria) are now neglected, but interesting for their old world air and for the untrammelled grace and luxuriance of growth which only neglected gardens show. On the abandoned terraces at the outskirts the native vegetation is rapidly resuming its sway. The still cared for parts of the garden consist chiefly of walled in enclosures, over the walls of which yellow and white Banksian roses clamber in unrestrained profusion. The plants growing in the borders were in keeping with the place: old oleanders and olives, *Chamaerops humilis*, hedges of rosemary and box, peonies, oranges, very old carobs (*Ceratonia Siliqua*), and such like. A touch of modernity is given by an excellent specimen of *Acacia cultriformis*, and the N. Asiatic flora was represented by numerous plants of *Pittosporum Tobira*, some 25 ft. high, and by beautiful specimens of *Spiraea cantoniensis fl. pl.*, whose long arching sprays were wreathed with pure white flowers.

## A Day in Montenegro.

Neither at Cattaro nor at Cettinje, the capital of Montenegro, is there much gardening to see, and the native vegetation on the road between the two places is very scanty. The road ascends to over 4000 ft., in climbing which one experiences of course the interesting transition from warm temperate to cold temperate and alpine conditions, and sees some of the most beautiful scenery in Europe. Unfortunately the country is so barren and rocky that the number of plants by the roadside is much reduced. At sea-level near Cattaro are growing figs, oranges, white mulberries, olives, myrtles and other plants indicative of a generous climate. Further up come *Petteria ramentacea*, *Spartium junceum*, both well known in English gardens, as well as *Calycotome infesta*, here as at Ragusa the gayest shrub in flower. In one place vast stretches of *Euphorbia Wulfenii* painted the mountain sides yellow. Approaching the summit of the pass the woody vegetation is reduced to common juniper and occasonally scrubby specimens of oak and beech, whilst in crevices between the stones grow primulas, hepaticas, violas and other alpines. In sheltered hollows far from the road woods of pine trees—probably some form of *P. Laricio*—are to be seen.

Most interesting of all are the small patches of cultivated ground the Montenegrins have managed to obtain by clearing off the stones. These patches are usually in hollows into which a scanty humus has settled, and many of them are only 4 or 6 yards across—strange little oases in a wilderness of stone. Judging by the old haulm, potatoes appear to be a chief crop. I should imagine the country between the Austrian frontier and the outskirts of Cettinje to be about as difficult to wrest a livelihood from as any in Europe. Only here and there does a meagre tree or patch of scrub relieve the vast rugged expanse of rock. The poverty of the country is

indicated by the thatched hovels in which the people live, floored with mud and often shared by fowls and animals. But the people themselves give no indication of being borne down by their condition. They are a tall upstanding race, reflecting in their bearing their long and triumphant fight for freedom and independence.

At Cettinje, which stands on a plain at something over 2000 ft. surrounded by mountains, the land becomes more fertile. The vegetation was about as far advanced as it was in England a month previously ; that is to say, the buds of most things were only just bursting, others had not stirred from their winter rest. The chief cereal appeared to be rye. A small public garden of little interest stands at the S.E. end of the town ; in this were used only trees and shrubs commonly planted in England, such as poplars, elms *Robinia*, common spruce, cherry, etc., none of notable size.

### Spalato.

Returning northwards to Spalato I found a rather interesting variety of trees planted in the streets : white mulberry with its rugged trunks, the heads being pruned back annually. *Gleditschia caspica*, *Broussonetia papyrifera* quite abundant as a shapely small tree on the road to Salona and laden with twisted catkins, *Celtis australis*, always distinguishable by its neat rounded heads and clean smooth trunks, and a few *Melia Azedarach*. The climate of Spalato is probably not so favourable as that of Ragusa, but no effort is made to beautify the place with the many delightful plants that might be used. The presence of vineyards, fine loquats heavily in fruit, *Cupressus sempervirens* and enormous bay-laurels show that a very large selection of trees and shrubs is available for use, but the Stadt Park is largely filled with Norway maple, lime, plane and *Acer Negundo* amongst deciduous things and among evergreens by the eternal *Euonymus japonicus* (very mildewy), *Biota orientalis*, the commonest and usually the only member of the *Thuya* group on this coast, and Aleppo pine very luxuriant and forming large plumose masses. Of more interest were *Cephalotaxus pedunculata* 20 ft. high and *Ligustrum lucidum* 35 ft. high and quite a tree. On the road to Salona Christ's Thorn (*Paliurus australis*), is used as a fence.

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## XXXIV.—COTTON.

The improvement of cotton by means of hybridisation has long been the subject of numerous and careful experiments on the part of the officers in charge of Botanic and Agricultural Stations in India, Egypt and our Colonies. The subject, however, is attended with difficulties of a very serious character which are mainly due to uncertainty as to the types used for hybridisation. In most cases pure races can only be detected or separated after years of laborious work owing to the extent to which promiscuous hybridisation has taken place, either by accident or design, during long years of cultivation. Another difficulty almost equally serious is that connected with the supply of seeds from the Experimental Stations.

A good hybrid cotton may be raised as a first cross, and from the seed distributed an excellent yield may be obtained. In those countries where the ginning of the cotton is entirely in the hands of the Government Departments concerned it is possible to arrange that only good seed shall be issued from year to year in return for the cotton sent in to the ginnery, and the deterioration in the quality of the cotton, which is liable to occur with the continuous cultivation of the offspring of hybrid plants, can thus be avoided. Where, however, ginning is not centralised and the peasant proprietor runs his own hand gin, or where the ginning is done by local communities as obtains in India, N. Nigeria and elsewhere, the difficulties in the way of attempting to improve the races of cotton under cultivation may be well nigh insuperable. This side of the problem is not the one which concerns us here at the present moment ; the object of this note being to draw attention to a very important series of experiments in cotton hybridisation on proper scientific lines which is being carried out by Mr. H. M. Leake, Economic Botanist at the Agricultural College, Cawnpore, India. A detailed account of these experiments has been published in the "Journal of Genetics," vol. i., p. 205 (Cambridge University Press), but the following abstract account of Mr. Leake's work is taken from the "Annual Report of the Board of Scientific Advice for India" for the year 1910–11.

"Several papers on this [the cotton] crop have appeared during the year of which the most important are those of Leake relating to the work on cotton breeding at the Cawnpore Experiment Station. The cotton investigations in progress at this centre are concerned with the production and the subsequent introduction into general cultivation of an improved type suitable for the western cotton growing tracts of the United Provinces. The papers published during the past year give an account of the progress made up to the present time and also outline the scheme of future work. While the direct results likely to be obtained from these investigations chiefly concern the Province concerned, nevertheless both the methods adopted in the investigation and the ideas underlying the work are of much more general application and will be studied by all concerned with the improvement of cotton in India.

"A popular account of this work was issued as a pamplet at the recent Allahabad Exhibition and reprinted in the *Agricultural Journal of India*. The present cotton crop of the Western Districts of the United Provinces consists of a confused mass of types which have been referred by Gammie to a single species *Gossypium neglectum*, Tod. All the forms are characterised by short and coarse lint and are entirely unsuitable for use in England or for any commercial purpose beyond the coarser kinds of cotton goods. Other forms of cotton also occur in these Provinces, but no indigenous type is met with a silky texture suitable for spinning between thirty shillings and forty shillings which it is the object of these investigations to produce. It is considered that the simple selection is not likely to be of much service in finding the type required, but practical results are expected from hybridisation. In the first place the red flowered late *Nurma* cotton with long staple has been crossed with the short stapled silky form of *Bani* found in

the United Provinces. In this cross the long staple and red flower of *Nurma* have been combined with the early flowering and silkiness of fibre of the *Bani*. In the second case, the long staple and red flower of *Numa* have been united to the high lint percentage and earliness of white flowered *Desi* cotton. The reports on the fibre of the new forms are very encouraging, and in one case the sample was valued at Rs. 50 a candy more than fine Cawnpore machine ginned and was considered equal to fine Broach. Other crosses are now being made and it is hoped that these will add still further improvement. The second stage of the work after the production of an improved cotton is to introduce it into general cultivation and to maintain the quality. For this purpose a seed farm is being started near Aligarh from which it is hoped to produce enough seed to sow one thousand three hundred acres in one year producing five hundred bales (of four hundred pounds) of cotton. The cultivators growing the one thousand three hundred acres of cotton will each year receive a fresh supply of seed from the central farm while their crop will be separately ginned and the seed distributed to a second series of cultivators controlling twenty thousand acres of land under cotton. In this way it is hoped a series of waves of cotton seed emanating from the seed farm will be started which will in a short period establish the crop on a firm basis.

"The student of plant breeding will find a detailed account of the Cawnpore cotton experiments in the *Journal of Genetics* (vol. i., p. 205), while an abstract has appeared in the *Proceedings of the Royal Society*. The inheritance of several of the characters of cotton have been worked out in detail and especially the colour of the corolla, the red colouring matter of the sap, the degree of incision of the leaf, the type of branching, the length of the vegetative period and the leaf glands. Several instances of correlation of character have been observed, two of which are of great interest. The forms with a majority of sympodial secondary branches are early flowering, while in those like *Nurma*, characterised by monopodial branching, the vegetative period is prolonged and no fruit is formed until the tertiary branches are developed. It is essential that plants should be of the sympodial type if their cultivation in the United Provinces is to be a commercial success, for the late flowering monopodial forms do not flower in time to give a crop before the winter sets in. At the same time the majority of Indian cottons with a valuable staple belong to the monopodial forms. It has therefore been necessary to resort to hybridisation in order to produce a new set of early flowering forms of sympodial habit, but bearing the long staple of the monopodial type. The second important correlation discussed is that between the presence of red colouring matter of the sap and an increase in the length of the vegetative period. When the red colour is present, there is a distinct retardation of the commencement of flowering.

"One of the chief difficulties in the production of a new and improved type of cotton and in the maintenance of the seed supply arises from the fact that cottons readily cross-fertilize in India as in other countries. During the preliminary breeding and selection operations it is necessary to protect the flowers from foreign pollen,

and to work entirely with self-fertilized seed. This circumstance adds greatly to the labour involved in the work, and also entails as a preliminary the isolation of pure lines from the mass of splitting forms (which make up the bulk of the cotton crop of India) before crossing can be begun. Further, an improved type will have to grow separately, and every care taken to keep the seed supply pure and to prevent any degeneration taking place as a result of vicinism. These aspects of the subject have been dealt with at Cawnpore and the results incorporated in an interesting paper in the *Memoirs of the Agricultural Department of India* (*Botanical Series*). During the progress of this work it was observed, both in the pure types and in the crosses, that some of the cultures carried on from year to year by means of self-fertilized seed exhibited varying degrees of sterility. These matters, however, were not for various reasons thoroughly worked out, but it is hoped that opportunity will be found to investigate them more fully in the future. As regards the method by which crossing takes place between different types of cotton, the authors consider that most of the crossing takes place between neighbouring plants, and that a distance of ten feet between the various plots is sufficient to greatly reduce, if not to prevent, it altogether. If these observations are found to apply to other cotton-growing tracts in India, one of the difficulties in maintaining a pure seed supply for distribution to cultivators will have been removed. It is now generally recognised that the degeneration which results when improved conditions are introduced into a new country is largely a result of vicinism. The exotics, in the first place, are often a mixture of types which cross among each other, while further degeneration results from crossing and admixture with local sorts. It is more than probable that the want of success in introducing foreign cottons into India in the past has been mainly due to natural cross-fertilization. It is possible, therefore, that if the work of introduction is properly carried on in the future considerable success might easily be obtained in this direction."

Attention may also here be called to the " Papers and Reports on Cotton Cultivation " presented to the International Congress of Tropical Agriculture, Brussels, May, 1910.

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## XXXV.—MISCELLANEOUS NOTES.

**Colonial Appointments.**—We learn that Mr. S. Simpson has been appointed Director of Agriculture, Uganda, in succession to Mr. P. H. Lamb, who has been appointed Director of Agriculture, Northern Nigeria.

We also learn that Mr. F. Evans, Curator, Royal Botanic Gardens, Trinidad (*K.B.*, 1903, p. 31), has been appointed Assistant Superintendent in the Agricultural Department, Southern Nigeria.

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Harry Dodd.—It is with great regret that we have to record the news of the death of Mr. H. Dodd, in India, on July 3rd, conveyed to us through the India Office.

EUPHORBIA MELOFORMIS.

ECHINOCACTUS ORNATUS.

[*To face page* 300.

CYCAS MICHOLITZII.

*To face page* 301.]

Mr. Dodd entered Kew as a young gardener in March, 1904, and left in July, 1906, to take up the post of Curator at Onitsha, Southern Nigeria. Before coming to Kew he spent some three years in the Liverpool Botanic Gardens.

He resigned this post in West Africa in June, 1910, at the close of his fourth year of service, partly with the object of obtaining a post in the East.

In February, 1911, Mr. Dodd was appointed a probationer gardener in India; and, after spending some time at the Royal Botanic Garden, Calcutta, was transferred to Delhi, where he died of enteric fever on July 3rd.

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**Euphorbia meloformis**, *Ait.*—This is one of the most remarkable of the South African species of Euphorbia, and, as seen from the photograph here reproduced, bears so great a resemblance to *Echinocactus ornatus* from Mexico, that a non-botanist would probably never suppose that they belonged to two totally different Natural Orders.

There are two species in cultivation under the name of *E. meloformis*, but the specimen here figured is the true plant of Aiton, and was originally introduced into this country by Masson in 1774. It is a native of the region extending from the districts of Uitenhage and Port Elizabeth to that of Albany, in South Africa. The specimen figured measures $5\frac{1}{2}$ inches in diameter, and has probably nearly or quite attained its full size. It is a male plant, as is indicated by the persistent cymes, which generally fall away from the female plant—at least so far as I have seen. The female plant is very rare in cultivation; the peduncles are shed after flowering, and I have not seen it bear fruit. N. E. B.

**Cycas Micholitzii.**—The history of this remarkable Cycad has been given in *Kew Bulletin*, 1910, p. 163, and in the Bot. Mag., t. 8242, where the male plant is the subject of an excellent figure. A considerable number of plants of this species were imported by Messrs. Sander, but with the exception of the female plant depicted on the right side of the accompanying illustration, all have so far proved to be male. This plant first coned in the winter of 1910, and has continued to do so annually since. The male plant matures its cones somewhat earlier than does the female plant. An effort to obtain seeds was made in 1910; pollen was saved and the ovules were dusted periodically. A number of ovules swelled up to over an inch in diameter and were allowed to mature, but on examination they all proved to be hollow. This false fertilization and swelling up of the ovules is quite common in many cycads under cultivation. In some cases the young seed may contain a mass of endosperm, but the embryo is absent, whilst in others it is quite hollow. At the present time the Kew specimen is again bearing a number of what are apparently good seeds; it remains to be seen whether they may be fertile. The Kew specimens have improved considerably under cultivation in tropical stove conditions. During the summer months they have been watered and syringed frequently, and during the autumn and winter months kept on the dry side, giving only just enough water to enable them to retain the leaves. The largest

number of leaves borne by a plant has been four, but the usual number is one or two. These are erect and arching at the top, the largest being about eight feet in length. The pinnae are reduced to spines in the lower half, those of the upper half dichotomously branched and varying from three to twenty inches in length, glaucous when young, glabrous and dark green when adult, and more or less undulate. The male cones are bright yellow in colour and from six to nine inches long. The female cone consists of about fifteen pectinate-pinnate carpellary leaves, the longest of which are about six inches, and some two to three inches broad, and bearing from one to four deep green ovules; these are now about one-third of an inch in diameter, and occasionally swell up to about an inch, changing to dull yellow when mature. The scale leaves are comparatively few in number, two to three inches in length, reddish-brown in colour, and, unlike those of the majority of Cyads, are completely deciduous. The stem is naked except in the upper few inches, dull pinkish-red in colour, tapering from below upwards, and more or less gouty.

C. P. R.

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**Botanical Magazine for July.** — The plants figured are *Agave marmorata*, Roezl (t. 8442); *Erica ciliaris*, Linn. (t. 8443); *Styrax Wilsonii*, Rolfe (t. 8444); *Cotyledon subrigida*, Robins and Seaton (t. 8445); and *Pseuderanthemum lilacinum*, Stapf. (t. 8446).

The Agave was originally collected by Roezl in the Province of Tehuacan, Mexico, and the plant figured was raised from a bulbil produced on one of the original plants in Lady Hanbury's garden at La Mortola in 1904. The plant illustrated flowered at La Mortola in June, 1911.

*A. marmorata* appears to be most closely allied to *A. Willdingii*, Tod. The flowers are small and bright yellow, so that it cannot be placed in Baker's group *Americanae*.

The form of *Erica ciliaris*, which is the subject of the plate, is one which is found in Portugal, where also the more commonly known form—native in Dorset, Cornwall and Galway—is also found This form was first noticed by Mr. G. Ward in Portugal in 1872. It has a more compact habit of growth, and its flowers are not secund as in *E. ciliaris* proper. It was re-introduced in 1882 by Mr. Backhouse as *E. Maweana*. The plant thrives at Kew, and makes a bright display of colour from July to October.

*Styrax Wilsonii* is a compact shrub most nearly related to *S. japonicum*, but about half the size of that plant in all its parts. The plant figured was raised from seeds presented to Kew by the Arnold Arboretum and collected by Mr. Wilson in China in 1908. The shrub flowered when only seventeen months old, and it is as yet uncertain whether it is quite hardy at Kew.

The *Cotyledon* is a remarkably handsome species, a native of Mexico, for the plant of which we are indebted to the authorities of the Natural History Museum at Washington. *C. subrigida* was discovered in 1892 by Mr. C. G. Pringle on ledges of cliffs in the Tultenango Cañon. A plant was sent to Kew in 1905, where it flowered vigorously in the Succulent House in October, 1911.

*Pseuderanthemum lilacinum*, a native of Selangor, was received at Kew in 1909 from Mr. H. N. Ridley under the name *Eranthemum Teijsmanii*. The plant is, no doubt, closely related to *E. Teijsmanii*, described by Clark in the materials for a Flora of the Malayan Peninsula (*P. Teijsmanii*, Stapf.), but it differs especially in being an erect shrub some three feet in height. It is a very suitable subject for a Tropical House.

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**Flora Capensis.**—The issue of the concluding part of the first section of Vol. V. of this work, edited by Sir W. T. Thiselton-Dyer, has now to be recorded. The section includes 747 pages, and has appeared in four parts, the dates of publication of which have been as follows :—

Part I., pp. 1–224, was published *June*, 1901.
Part II., pp. 225–448, was published *May*, 1910.
Part III., pp. 449–640, was published *January*, 1912.
Part IV., pp. 664-end, was published *June*, 1912.

The orders dealt with are the remaining Bicarpellatae—Acanthaceae—Plantagineae and Monochlamydeae—Nyctagineae—Proteaceae.

The Editor's Preface, in which the history of the production of this important volume has been given in detail, is reproduced below:—

"On the completion of Volume VII. the preparation of Volume IV. was taken up. Professor Francis Guthrie and Dr. Bolus undertook in South Africa the elaboration of *Ericaceae*. Meanwhile, with the aid of contributors whom I was able to enlist at home, a commencement was made with the present volume, and the first part was published as long ago as 1901. Unhappily the death of Professor Guthrie in 1899 and the failing health of Dr. Bolus left their contribution unfinished, and it had to be continued and completed at Kew. It became impracticable to make any further progress with Volume V. till the two sections of the preceding one had been disposed of.

"In a vast undertaking like the present, the progress of which is necessarily protracted, it is the inevitable but melancholy task of the Editor to record the loss from time to time of those whose generous assistance and co-operation have made its ultimate accomplishment possible. That it should be so must be his justification for the somewhat erratic mode of publication which he has felt obliged to adopt. Particular orders have been as far as possible entrusted to those who had made them a special study. Had he waited to invoke their aid in following a continuous sequence, that aid would in at least two cases have been unavailable and with difficulty replaced.

"Charles Baron Clarke, M.A., F.R.S., died 25th August, 1906 ; he elaborated *Commelinaceæ* (1897), *Cyperaceæ* (1898), and *Acanthaceæ* (1891) in the present volume. (Obituary notice and bibliography, *Kew Bulletin*, 1906, pp. 271–281.) Maxwell Tylden Masters, M.D., F.R.S., died 30th May, 1907 ; he

worked out *Restiaceæ* for the *Flora* in 1897. (Obituary notice and bibliography, *Kew Bulletin*, 1907, pp. 325–334.) Dr. Theodore Cooke, C.I.E., F.L.S., on the completion in 1908 of his Bombay Flora on which he had been engaged for ten years, volunteered his aid for the *Flora Capensis*. He rendered great service by filling up many gaps in the present section undisposed of at the moment. I had hoped to receive from him more extended contributions, but while occupied on *Amarantaceæ* he was seized with illness which terminated fatally on 5th November, 1910. (Obituary notice, *Kew Bulletin*, 1910, pp. 350–352.) The death of Harry Bolus, D.Sc., F.L.S., in England on 25th May, 1911 (obituary notice, *Kew Bulletin*, 1911, pp. 275–277), is something more than the loss of a contributor of specialized accomplishments. In his knowledge of the South African flora it may be said with confidence that Dr. Bolus had no living rival. I cannot do better than quote a few words from Professor Pearson's penetrating appreciation of his work and character (*Kew Bulletin*, 1911, pp. 319–322):—'By common consent Dr. Bolus occupied a unique and honoured place amongst botanical workers in South Africa. His death removes one of the most striking figures from the ranks of her scientific men, and leaves a vacancy which no man can fill. In the annals of South African Botany his name and his record will be written in large characters.' Dr. Bolus took more than a keen interest in the progress of this work. As has been acknowledged in previous prefaces, Kew has received from him a continuous stream of fresh and novel material. Nor can it be doubted that his position and reputation in South Africa weighed with the Legislature of Cape Colony in inducing it to make successive grants in aid of its preparation and publication. Having during his lifetime endowed the Chair of Botany in the South African College, he bequeathed to it his herbarium and library and a considerable portion of his fortune.

"From Volume IV. onwards the area comprised in the *Flora* has been extended to the Tropic. In many of the regions so included material is scanty or wholly wanting. It is therefore with no small satisfaction that I am able to record that the Percy Sladen Memorial Expedition (assisted by a grant from the Royal Society of London) worked between Ceres Road in Cape Colony and Lüderitzbucht in Great Namaqualand in the summer of 1908–9, and a second expedition under the same auspices, between Eendekuil in Cape Colony and Sendling's (or Bethany) Drift in the Orange River in the summer of 1910–11. The summer flora of the greater part of these regions was previously little known, and the material collected in Bushmanland and the eastern part of Great Namaqualand in the former journey and in the Richtersveld (between Ookiep and the Orange River) in 1910–11, furnishes many new records of distribution and contains a considerable number of new species.

"The Natal Government has made no contribution to the work since 1907. On the other hand, that of the Transvaal has given spontaneously a liberal grant, and this has been followed by a still more substantial one, which it is hoped will provide sufficiently for the completion of the work.

"In the present section I have been again fortunate in securing the aid of contributors who, in many cases, were able to bring to bear the advantage of previous study on the groups they undertook. Amongst these are Mr. C. B. Clarke, F.R.S., who worked out *Acanthaceæ*, and Mr. R. A. Rolfe, A.L.S., *Selagineæ*. I have had the further advantage of the continued co-operation of South African botanists. Professor Pearson has contributed *Verbenaceæ*, and I am indebted to the Trustees of the South African Museum for granting leave of absence to Mr. E. P. Phillips, one of their staff, to come to Kew to work out *Proteaceæ*, an order with which he had obtained a first-hand acquaintance in the field. The expiration of Mr. Phillips's leave left his task in some respects incomplete, and I am indebted to Dr. Stapf, F.R.S., Keeper of the Herbarium, and to Mr. John Hutchinson, Assistant for Tropical Africa, for supplementing what was needed to Mr. Phillips's work. The laborious task of elaborating *Labiatæ* was undertaken simultaneously by Messrs. Brown and Skan, and by Dr. Cooke.

"I continue to be indebted for invaluable aid to Mr. C. H. Wright, A.L.S., and to Mr. N. E. Brown, A.L.S., Assistant Keepers of the Herbarium, the former in reading the proofs and in other ways, the latter for working out the localities and distribution.

"For the limits of the regions under which the localities are cited in which the species have been found to occur, reference may be made to the Preface to Volume VI.

"Besides the maps already cited in the Prefaces to Volumes VI. and VII., the following have also been used :—

"Map of the Colony of the Cape of Good Hope and neighbouring territories. Compiled from the best available information. By John Templer Horne, Surveyor-General, 1895.

"Stanford's new Map of the Orange Free State and the southern part of the South African Republic, etc., 1899.

"Carte du Théatre de la Guerre Sud-Africaine. Par le Colonel Camaille Favre, 1902.

"To many of the South African correspondents of Kew enumerated in previously published volumes I have again to tender my acknowledgments for the contribution of specimens in aid of the work to the Herbarium of the Royal Botanic Gardens.

"I must further record my obligations to some new contributors, and to those whose kind assistance in various ways has been of the greatest value in the preparation of this section of Volume V.

"Prof. G. Beck, Ritter von Mannagetta und Lerchenau, University of Prague. Loan of *Proteaceæ*.

"Harry Bolus, Esq., D.Sc., F.L.S., contributed many specimens, and lent portions of his Herbarium.

"J. Burtt Davy, Esq., F.L.S. Plants from the Transvaal.

"Prof. H. H. Dixon, F.R.S., Trinity College, Dublin. Loan of the *Labiatæ* in Harvey's Herbarium.

"R. A. Dümmer, Esq. Plants from Namaqualand and Cape Division.

"Prof. J. Eichler, Curator of the Botanic Department, K. Naturalienkabinet at Stuttgart. Loan of *Protaceæ*.

"Geheimrath Dr. A. Engler, Director of the Botanic Garden and Museum, Dahlem. Loan of *Selagineæ* and *Proteaceæ*.

"Prof. C. Flahault, Director of the Institute of Botany, University of Montpellier. Collection of Basutoland Plants.

"E. E. Galpin, Esq., F.L.S., Queenstown, Cape Colony. Large collections of South African plants and loan of portions of his private Herbarium.

"Dr. H. O. Juel, Director of the Botanic Garden, Upsala. Loan of portions of Thunberg's Herbarium.

"Prof. C. A. M. Lindman, Curator of the Botanic Department of the Natural History Museum, Stockholm. Loan of *Proteaceæ*.

"Dr. J. Muir. Specimens from the Riversdale District.

"Dr. L. Péringuey, Director of the South African Museum, Cape Town. Various duplicates and loan of specimens from the South African Museum.

"E. P. Phillips, Esq., M.A. Collection of *Proteaceæ* and others.

"Mrs. R. Pott (formerly Miss R. Leendertz). Plants from Transvaal.

"Prof. Hans Schinz, Director of the University Botanic Garden and Museum, Zürich. Large collections of South African plants and loan of specimens.

"Dr. S. Schönland, Curator of the Albany Museum, Grahamstown. Contribution and loan of specimens of *Proteaceæ* and others.

"Prof. E. Warming, late Director of the Botanic Garden, Copenhagen. Loan of *Selagineæ*.

"J. Medley Wood, Esq., A.L.S., Director of the Botanic Garden, Durban. Collection of Natal plants and loan of specimens.

"Dr. A. Zahlbruckner, Keeper of the Botanic Department of the Hofmuseum, Vienna. Loan of *Labiatæ* and *Proteaceæ*.

"I must allow myself more personally to express my indebtedness to Lieut.-Colonel Prain, C.M.G., C.I.E., F.R.S., Director of the Royal Botanic Gardens, for kind and unfailing assistance in many ways, without which the task of editing a work of this kind at a distance from the resources of Kew could hardly be accomplished.

"It has been the practice, at any rate in the more recent works that have emanated from Kew, to conform to the classification and sequence of orders adopted in Bentham and Hooker's *Genera Plantarum*. This work was not available to Professor Harvey when he commenced the *Flora Capensis*, and he appears to have based himself on the *Prodromus* of Augustin Pyramus de Candolle, in the three volumes of which he was the author with Dr. Sonder. From Volume IV. onwards of the continuation the *Genera Plantarum* has been followed. There is in consequence an inconsistency between the earlier and latter portions of the work in regard to the delimitation of the sub-classes adopted, which, although of little practical importance, inasmuch as it scarcely affects the sequence of the orders, it is desirable to clear up. How this arises will be apparent from the statement with which Professor Harvey commences the preface to his third volume: 'This . . . contains the orders of Calycifloræ with a monopetalous corolla

and an inferior ovary. The fourth volume . . . will, it is hoped, include the Heaths (*Ericeæ*) and all the *Monopetalæ* with superior ovaries, *i.e.*, the COROLLIFLORÆ proper.' BENTHAM and HOOKER in the *Genera Plantarum* have adopted the sub-class GAMOPETALÆ from Endlicher, who had established it in 1836 to include all orders with a monopetalous corolla. This arrangement has been followed in the present work from Volume IV. onwards. The removal of monopetalous orders from *Calyciflorœ* does not, however, affect the sequence in which they are dealt with. But in order to make the classification consistent throughout, it is necessary in the first place to substitute the following new definitions of sub-classes 1–3 for those given by Professor HARVEY in Vol. I., p. xxxiii."

"Sub-class I.—THALAMIFLORÆ. Ord. I.–XLI. (Vol. I., pp. 1–449). *Calyx and Corolla* (generally) present. *Petals* separate, inserted, as are also the *stamens*, on the receptacle (i.e., *hypogynous*). *Ovary* free.

"Sub-class II.—CALYCIFLORÆ. Ord. XLII.–LXX. (Vol. I., pp. 450–528; Vol. II., pp. 1–572). *Calyx and Corolla* (generally) present. *Petals* separate. *Stamens* inserted on the calyx (*perigynous*) or on the ovary (*epigynous*). *Ovary* free or more or less adnate to the calyx-tube. LXXI. *Balanophoreæ* (Vol. II., p. 572), and LXXII. *Loranthaceæ* (Vol. II., p. 574) are transferred to MONOCHLAMYDEÆ.

"Sub-class III.—GAMOPETALÆ. Ord. LXXIII.–CVI. (Vols. III., IV., and V., sect. 1, pp. 1–392). *Calyx and Corolla* both present. *Petals* united in a gamopetalous corolla. *Stamens* inserted upon the corolla. *Ovary* free or more or less adnate to the calyx-tube.

"In the second place, the 'Sequence of Orders' in Vol. III., p. ix., must be remodelled as below; the definitions of the orders themselves are unaffected.

"Sub-class III.—GAMOPETALÆ. Ord. LXXIII.–LXXVII.

"Series I.—INFERÆ. Ord. LXXIII.–LXXVII. *Ovary* inferior.

"COHORT i.—RUBIALES. *Stamens* epipetalous. Ovary 2–∞-celled, cell 1–∞-ovuled.

"LXXIII. RUBIACEÆ (page 1).

"COHORT ii.—ASTERALES. *Stamen* epipetalous. *Ovary* 1-celled, 1-ovuled.

"LXXIV. VALERIANEA (page 39).

"LXXV. DIPSACEÆ (page 41).

"LXXVI. COMPOSITÆ (page 44).

"COHORT iii.—CAMPANALES. *Stamens* usually epigynous and free from the corolla.

"LXVII. CAMPANULACEÆ (page 530)."

WITCOMBE, 6*th May*, 1912.

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**Makruss or Zimbiti.**—This interesting tree, described in this work for the first time in December, 1908 (*K.B.*, 1908, p. 439), as *Androstachys Johnsonii*, was almost simultaneously described and figured by Mr. T. R. Sim (Forest Flora and Forest Resources of Portuguese East Africa, p. 66, t. 61A), in January, 1909. A fuller account of the tree was published in June, 1909 (*K.B.*, 1909,

p. 201), without it being possible to refer to Mr. Sim's account, a copy of which, through the courtesy of the author and his publishers, was presented to the Library at Kew on 12th August, 1909.

More recently we have been indebted to the courtesy of Mr. J. Burtt Davy for the communication of specimens of the same species from the Lebombo Mountains, whence also came those dealt with by Mr. Sim. In describing and figuring the tree, which he was compelled to do without either flowers or fruits, Mr. Sim, depending upon the character of the stipules, placed the species in the natural family *Rhizophoreae*, and referred it doubtfully to the genus *Weihea* as *W.? subpeltata*. By Mr. Burtt Davy it was in the field referred correctly to *Androstachys Johnsonii*, Prain. Mr. Sim had specimens sent from Mozambique in connection with an application by the Railway Department as to its utilisation for sleepers; he collected it himself in dense pure thickets in kloofs on the Lebombo Mountains, where its timber is well known. Mr. Burtt Davy's specimens are also from kloofs of the Eastern Lebombo Mountains, where "the tree is gregarious, forming dense thickets." Mr. Sim states that he was informed by English, Dutch, Kaffir and Swazi alike, "that bees nesting in this tree made poisonous honey." He found the trees always with fine clean straight stems, but was informed that very large specimens are usually hollow. Mr. Burtt Davy speaks of the timber as apparently practically indestructible.

The vernacular names given by Mr. Sim are:—(1) "Umbitzan," in the Tronga language spoken at and near Lourenço Marques; of this name the word "Zimbiti," sent by Mr. W. H. Johnson from Beira, seems a variant. (2) "Mocurusse," in the Swahili language, the name originally communicated by Mr. Consul O'Neill from Mosembe as "Makruss" in 1883; and (3) "Bekungu," in the Swazi language as used on the Lebombo Range. In a letter dated 17th April, 1912, forwarding his Lebombo specimens, Mr. Burtt Davy uses the name "um Koobookooboo"; but in a subsequent letter dated 10th June, 1912, the same correspondent uses the modified form "Ubu-Koonkoo," which more clearly approaches the form from the same general locality employed by Mr. Sim.

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**Federated Malay States.**—An interesting guide to the Federated Malay States, edited by Mr. C. W. Harrison, of the Malay Civil Service, has recently been published by the Malay States Information Agency. The book is well illustrated, both by colour reproductions and photographs, and contains an excellent map.

Among other items the Malay Peninsula from north to south is described, especially in relation to the railway line from Penang to Singapore. There are also useful notes for travellers, containing accounts of the various peoples of the peninsula and their habits, customs, etc., and much practical information on all subjects likely to be needed by the visitor.

Big game shooting occupies another chapter, and there is a very interesting account of the museums at Taiping and Kuala Lumpur, in which the collections are referred to in some detail.

A list of Rest Houses, Tables of Distances, and other useful information concludes the volume, which is supplied with a good index.

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